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Proposed Changes at the Institute.

AS we noted in our leading article of the 18th ult., the proposed changes in the method of electing Fellows of the Royal Institute of British Architects by the abolition of the ballot, have led to a discussion of the far more important question of the qualification for the Fellowship. The resolution which was to have been proposed by Mr. Charles Barry at the meeting which we were then considering was the subject for the adjourned general meeting held last Monday. The principle which Mr. Barry and those who think with him are eager to urge forward is that which was clearly contemplated when Section 3 of the Charter was drawn up and settled as follows:—

"Fellows shall be Architects who have attained the age of thirty years, and who have been engaged as principals for at least seven successive years in the practice of Architecture. After the expiration of five years from the date [March 28, 1887] of this, Our Charter, the Royal Institute shall have power to declare that every person desiring to be admitted a Fellow shall be required to have passed such Examination or Examinations as may be directed by the Royal Institute. But in special cases the Council shall have power to dispense with such Examination or Examinations."

The resolution which Mr. Barry moved on Monday last was as follows:—

"That, in view of the fact that young men only just past the prescribed age of thirty are, under the existing system, qualified to be elected as Fellows without evidence that they have passed any constituted examination evidencing their fitness; and whereas all candidates for the Associateship are now required to pass an examination to prove their fitness, and which does in effect do so; and whereas the above-named outside candidates for Fellowship can, so long as the existing system continues, evade all examinations until the Institute shall declare that no Fellow can be elected without a test examination; and whereas this may not take place for some time: It is desirable that the Council be instructed to take steps forthwith to obtain a declaration of the Institute that, from a given date,—say, two or three years,—every candidate for Fellowship shall be an Associate, or shall have passed an examination qualifying him for Associateship, except in such special cases of age, merit, or distinction as shall justify the Council in dispensing with such examination under Section 3 of the Charter."

As we have before pointed out, the line of action indicated by Mr. Barry's proposition is really the only logical sequel to the adoption of the principle of examination as a test of the fitness of candidates for the Associateship.

The only direct line of opposition, therefore, which was taken to Mr. Barry's proposal was that championed by Mr. Beresford Pite, who, as the representative of the views of certain "eminent outsiders," attacked the Examination for the Associateship as vehemently and persistently as the chairman could allow without going too far from the question before the meeting.

Thus we have the issue clearly defined. On the one hand, those who believe the existence and continuance of the examination test for Associates to be of importance for the welfare of the Institute, cannot avoid the necessity for imposing some test for candidates for the Fellowship, inasmuch as it is not to be tolerated that it should be possible to say that any candidates for membership of the Institute can evade the examination by passing into the superior class of Fellows. On the other hand, those who are opposed to anything like an examination test for the Fellowship, feel themselves under a like necessity to oppose the existing examinations. This is evidently the position taken by the "eminent outsiders" to whom Mr. Pite referred. They object to the principle of examination *in toto*, because they see that it leads naturally to some kind of test for the Fellowship, and this, they fear, may lead ultimately to registration, although it by no means follows, as was implied by Mr. Pite, that it would necessarily do so.

We can hardly regard it as redounding to the dignity of the Institute that so much stress should be laid on the opinions of the "eminent outsiders." It cannot be forgotten that some of these gentlemen have, in the past, held themselves aloof from the Institute for reasons quite unconnected with the question of examination, and might possibly still stand aloof if examinations were abolished. Nor can it be denied for a moment that there are within the ranks of the Institute men at least equal in every respect, both in position and in ability, to those without its pale.

If, therefore, the members of the Institute are convinced that the examination test is an advantage to the well-being of the corporate body, it would be the height of pusillanimity to sacrifice that conviction to the opinions of any outsiders, however high their position, or however transcendent their artistic ability.

The form in which opposition to Mr. Barry's actual proposition was made was by an amendment, brought forward by Mr. Alexander Graham, referring the subject to the consideration of the Council. This appeared to shelve the matter indefinitely, and thus probably received the support of those who are opposed to the principle of examination, and was contested by those who think the time has come for the Institute to avail itself of the permission accorded by Section 3 of the Charter.

Everyone seemed to admit that an examination for gentlemen who have arrived at such a point in their professional career as to be worthy of the dignity of the Fellowship would be, to say the least, a very difficult matter; and had the question been pressed to a division, it seems highly probable that the principle of electing Fellows, save in exceptional cases, wholly from the ranks of the Associates, would have been adopted. The modification, however, which Mr. Slater suggested to Mr. Graham's amendment, and which was adopted both by Mr. Graham and, on the President's appeal, by Mr. Barry, enabled the meeting to come to a unanimous decision to instruct the Council to take the whole matter into consideration, and to report to the Institute as soon as possible, with proposals as to the best method of carrying out Section 3 of the Charter.

We cannot but think that this was a wise and politic decision. The questions that are at issue are of such vital importance to the well-being of the Institute and of the profession, particularly amongst non-metropolitan architects, that it would be in the highest degree regrettable if a hasty decision was arrived at, either one way or the other.

We do not ourselves see how the Institute can go back on the policy of examining candidates for the Associateship, particularly in

view of the success which has attended that policy, especially in the provinces. This being so, the continuance of that policy necessarily involves that it shall not be easier to enter the superior than the inferior class of the membership.

The imposition of the examination test for the Fellowship is, however, practically an impossibility, and there therefore seems to be no better way out of the difficulty than to adopt the principle proposed by Mr. Barry's resolution, unless an entirely different character be given to the Fellowship, and admission to this superior class be reserved for those who have shown by their work that they are possessed of very much more than average artistic ability, and have also such a large measure of business capacity as shall have enabled them to induce the public to give tham an opportunity of showing their pre-eminence in artistic power. This latter alternative is probably that which the anti-examination party would like to see adopted, but it can hardly be contended that such a class of members would be consonant with the spirit of the Charter, to say nothing of its letter.

It was probably with some idea of conciliating those who desire an increase of dignity for the Fellowship that Mr. Barry wished to amend the resolution of which he had given notice, by including a proviso that Fellows should be at least forty years of age, and have been twelve years in practice. This, of course, the President, as chairman, ruled out of order and contrary to the wording of the Charter that Fellows should be thirty years of age and have been seven years in practice. Mr. Barry's argument that the greater included the less was clever, but hardly satisfactory.

We trust that the Council will devote their best energies to the consideration of the important questions now before them, and, if necessary, adopt the course which some members advocate, of appointing a special committee to investigate the whole question in a thorough and deliberate manner.

OLD TOURAINE.

THE old province of Touraine, represented in the present day pretty nearly by the Department of Indre-et-Loire, is a kind of hallowed ground to architects and archæologists—hallowed in an æsthetic sense only, for certainly that adjective is about the very last one could apply to the historical associations connected with the châteaux of Touraine, which have witnessed about as much cruelty, treachery, and debauchery as any set of human habitations within the period of modern history. The contemplation of this side of the history of the old châteaux is not so inviting, in a sense, as the study of their architecture, but the whole interest of the places is very much increased if we take the human along with the architectural history, and keep before the mind's eye the picture of the men who built these grand houses, half castle half palace, the events that took place in them, the lives and personalities of the men and women who lived and died (or not infrequently were murdered) within their walls. Architectural students are rather too apt to forget this half of the picture, and to busy themselves merely with sketching the architectural details of Blois, and Azay-le-Rideau, and Chenonceaux; while historians, on the other hand, are often indifferent to the architectural value and significance of the buildings in which the actors of their drama lived and moved and had their being. The merit of Mr. Cook's book on "Old Touraine"* is that of combining the two interests; to the character of a historian of men he adds that of a lover of architecture, and his book is a comprehensive sketch both of the general architectural character of the châteaux of Touraine, and of the lives and character of their inhabitants, and the principal events which took place within their walls. Thus it ought to be a book of considerable interest to those architects who are anything more than mere "architectural practitioners"; they will not learn anything new about the architecture of the châteaux from Mr. Cook's pages, but they will find there an enlightened and enthusiastic interest in the architecture, coupled with a picturesque and vivid sketch of the life and the events which centred round them. Regarded in this way, the châteaux are no longer mere architectural efforts, serving to illustrate the history and changes of Late French Gothic and Early French Renaissance; they have a human interest as well; they are filled, to our imagination, with the exuberant, licentious, and often cruel and treacherous life of French society of the Late Mediæval and Renaissance period.

It is curious to note what a number of names familiar to every student of architectural history are included within this district of which Tours is the centre. A little way down on the right bank of the Loire is Langeais; above it, on the left bank, is Amboise; further up, on the right bank, Blois; not far up the Indre frown the mighty masses of Loches castle; Fontevrault, Chenonceaux, and Azay-le-Rideau, are all included in the same district. In this district, till the end of the sixteenth century, the French Court, as Mr. Cook expresses it, "moved to and fro among the pleasant castles of Touraine," before it took up a more permanent and stately home at Versailles.

After a sketch of the early history of Touraine, the author commences his notes of special places with Chinon, at the junction of the Loire and the Vienne, where Jeanne d'Arc first made her appearance as the champion of her country, and where, according to Rabelais (whose statue stands in the market-place) was the "voyre (foire) première du monde." The interest of Chinon is rather historical than architectural, that is to say the architectural interest has somewhat crumbled and disappeared. "It is easy to people Blois with the gallants of Henry III.'s Court, or the intrigues of Louis XIV.; Chenonceaux tells its own light uneventful story in every ripple of reflected sunbeam on its graceful windows; but Chinon, greater in extent than all of them, a very wilderness of towers and battlements—Chinon is in ruins irretrievably." The author gives a sketch of the bridge and gate-house, and some description of the other architectural remains, including traces of Roman work, for Chinon was a Gallo-Roman station. It is melancholy to think that the room in which Jeanne d'Arc was first received by the king has been allowed to fall to ruin or be destroyed.

Fontevrault, to which the author next conducts us, is marked to the architect by one of the most characteristic examples of the meeting of Classic and Gothic modes of building, in the combined column and buttress forms of the exterior of the chevet of the church, and to historians as the sepulchre of certain of the Plantagenet kings and queens—Henry II., Richard I.; Eleanor of Guienne, the wife of Henry II., and Isabel of Angoulême, who married King John. The effigies of the three first named "are of colossal size, hewn out of the tufa rock, and painted. The last, and perhaps the best of the four as a work of art, is of smaller size and carved in wood, which has also been coloured."

From Fontevrault the author takes us to Loches, where he gives a vivid description of the remarkable château, with its three main gradations of style—the wide mullioned windows of the Louis XII. wing, the small windows and repeated round turrets of Charles VII., and the vast and frowning keep which leaves the strongest impression of all on the minds of most visitors. Mr. Cook says:—

"We looked up from beneath at the four great walls or rather cliffs of stone which formed the keep, where traces of four stories were still visible, reached by stairs cut in the thickness of the wall, and capable of containing 1,200 men. The question of supplies was settled by a dark and unwholesome-looking hole sinking into the bowels of the earth, through which the food for the garrison was raised. The whole had evidently been built more with a view to durability and strength of resistance than elegance or grace; a relic of the older days, which was almost deserted by the time Francis I. had metamorphosed the feudal castles of Touraine into so many royal hunting-seats."

Perhaps there is no example more striking than Loches of the manner in which, in past times at all events, architectural changes have given the outward expression of social changes. There is an absolute savagery about the old keep which is eloquent of violent and tyrannous times. All of the misery that has been suffered and the cruelty perpetrated within those grim walls we shall never know now, but the author quotes enough of what is known to add an even more sinister interest to the place than its architectural expression suggests.

Mr. Cook quotes Langeais as forming a kind of connecting link between the Mediæval fortress and the Early Renaissance château. Externally it is entirely Mediæval in appearance, with its great round towers with their conical roofs, and the ponderous machicolation carried all round; internally, towards what we may now call the garden side, there is a cornice. "The problem which its architect had to solve was to combine a stronghold capable of defence with a house calculated for the increasing necessities of daily life." In plan the castle is in shape of an L with an obtuse instead of a right angle, the short leg of the L being separated from the range of rooms in the longer portion, and reached by a separate staircase. Much interesting history is told of Langeais and its various owners, and one is glad to read that at the present day it is in the hands of an owner (M. Siefried) who thoroughly appreciates the historic and architectural interest of the building; "no ancient castle," says Mr. Cook, "could possess a better châtelain; all its old beauties are preserved, and the necessities of a more complex modern life are introduced with a care and an artistic feeling that leave no sense of incongruity or incompleteness." The view of the château from its interior or garden side, introduced in the book, showing the present state in which it is kept, completely bears out this description.

Chaumont and Chenonceaux occupy the rest of the first volume and a portion of the second. Nothing in the exterior of French châteaux is more picturesque than the view of Chenonceaux looking along the river, with its groups of pointed roofs and turrets and chimneys on the bank, and the long galleries stretching on arches across the river (the Cher); nor can we agree with the author in thinking this (the work of Catherine de Medicis) "the least happy of the additions to the original château"; on the contrary, there is an architectural boldness in the idea which is very impressive, and the effect of building in this way is so picturesque in itself that even the dullest architecture would look interesting when built on an arcade over water. With Chenonceaux is connected the name of the gracious and lovely Diane de Poitiers, and of Catherine de Medicis and her brilliant fêtes, and in later times of Dupin, the friend of Montesquieu, when it became a centre for literary celebrities. The château seems to have had a tendency to get its owners into debt, and now the Credit Foncier have it, and charge a franc for admission to (in our author's words) "this home of beautiful women and gigantic debts."

Of the more sinister records of Amboise and Blois there is a good account given in the chapters devoted to those famous châteaux. Mr. Cook refers to a remark of Balzac's, which we do not remember, to the effect that later generations would know nothing of Blois except from his pages, so decayed was the place in his day. The "conscientious restorer" has at any rate saved the building materially, if he has injured it in other respects,—

"But at Blois no change, no renovation, can check the rush of memories that press upon the

* "Old Touraine: the Life and History of the Famous Châteaux of France." By Theodore Andrea Cook, B.A. London: Percival & Co. 1892.

traveller directly he has crossed the threshold beneath the statue of the good King Louis, for the three-fold fashion of the architecture around him speaks eloquently of the three great ages through which the life of the castle has passed. The early years when the Orleans Princes were educated here, and Valentine Visconti mourned her murdered husband; the terrible days of the sixteenth century, when Guise was murdered above the exquisite carvings of the central staircase; finally, the decaying glories of Gaston and his daughter, fitly framed in the ruled lines and spaces of the frigid building opposite the entrance."

The author is enthusiastic on the celebrated staircase, but he had better have left out his introduction of the spiral sea-shell and his suggestion of a suggestion from it. This is akin to the heresy of the Gothic vault and branching trees. However architecture may go to nature for some of its carved detail, Mr. Cook may be assured that constructive architecture and constructing architects have nothing to do with imitations of natural form, nor is there the slightest necessity for seeking such an origin for such a construction as the spiral staircase at Blois. Given the problem of constructing a spiral staircase under certain conditions of architectural style (consequently with certain forms of moulding, &c.), and of doing all in masonry in the most compact and scientific manner; given a clever master-mason ambitious to do the thing as well as possible for his own honour and *kudos* in a building of exceptionally sumptuous character, and where there was no limit as to funds,—give these conditions, and the staircase will be evolved as the natural result of the constructive and architectural conditions, and there is no need to run after spiral sea-shells for it. It is only the ordinary winding staircase treated with an elaborate system of mouldings and ornament, and carried out with exceptional care. The spiral line of the mouldings follows from the necessary line formed by the steps. The public are so prone to take up these sentimental ideas about imitation of nature, that it is vexatious to meet with them in a book likely to be popular; and if the book comes to a second edition we hope the author will strike out this passage and his unnecessary shell illustrations.

Of the great tragedy of Blois, the assassination of the Duke of Guise, the author gives a careful and very vivid account, accompanied by a plan of the portion of the palace in which it occurred, and on which we can follow out in imagination the whole action, the movements of the victim and his assassins. There is an interesting chapter about Chambord, which the author happily observes is a parody of a Mediæval building, just as Rabelais' "Thelema" was a parody of Mediæval monasticism. Chambord has had a strange and varied history, and been dreadfully knocked about at different times, finally having been garrisoned by the French and taken by the Germans in the 1870 war. The author says, "our last, and perhaps most satisfactory,* visit was to the forest of masonry on the roof. Chimneys had expanded into monuments and lanterns into mausoleums, yet none of the grace with which the chimneys are treated at Azay or Chenonceaux is visible; nothing strikes the onlooker but a massiveness without much object, in which any beauty of detail is only thrown away." In our review of Architecture at the French Salon this year we noticed a large drawing for the restoration of one of these mammoth erections on the roof of the château of Chambord, and remarked on the futility of the squares and diamonds of black (slate, Mr. Cook tells us) let into the walls as ornament.

The beautiful château of Azay-le-Rideau is dismissed in a rather short though sympathetic chapter; we may refer the reader to a long account of it given in the *Builder* for March 30, 1889 (written by a French contributor). But as a whole this is a charming book, comprising a great deal of information within a small space, and written in an eloquent and picturesque literary style. We recommend it to the notice of those who are about to visit the châteaux of Old Touraine, whether for sketching or only for inspection. As we have said, it will teach architects nothing about the architecture, but it will give them a far greater interest in the history and associations of the buildings, a side of the matter which sketching architects (especially of the younger generation) are rather too apt to pass over.

* Should this be "unsatisfactory"? The context seems rather to require it.

NOTES.

THE General Election has shown very noticeably the need in the villages of rural England of village halls wherein political meetings can be held, and at other times entertainments and classes. Without such village halls it is almost impossible for the rural voter to receive a political education, for it is becoming more and more obvious that it is not only immediately before an election, but during the general life of a Parliament, that the member, or even the possible candidate, must address the voters of a locality upon the subjects of current political interest. School-rooms are not infrequently used for the purpose, but there is no question that such use is inconvenient, and is also detrimental to the school fittings. It is a question well worthy of consideration, whether the County Councils might not give grants in aid of village halls out of the money now in their hands, which is often thrown away on very amateurish teaching of cookery and so-called technical education. Before technical education can really take a hold of localities there must be a place wherein it may be taught, and village halls would supply this want.

THE decoration of the outer lobby of the Guildhall Council-chamber has recently been completed, at the expense of Mr. Alderman Knill, as a memento of the year he served the office of Sheriff of London (1889-90), and "as a mark of his affection and reverence for the ancient Corporation of London, and for those illustrious Guilds which from the earliest times have worked together so harmoniously." This method of expression of goodwill is commendable, and suggestive of the times when art was a more vital force than it is at present. The outer lobby is a small one, and has but one,—the east,—wall with unbroken surface; these walls are stuccoed, and have the lines representing stone joints. These lines are left, and somewhat disfigure the paintings which have been added. The east wall has the City arms, with red crossed shield and the red sword of St. Paul, the patron of the Cathedral, thereon, and the dragon's wing above. Two dragons of tame deportment support the shield, and beneath appears the well-known motto, "Domine dirige nos." The whole subject is surrounded with a conventionally-treated rose-tree, forming a border on three sides, with the arms of the twelve great Livery Companies. In the space on the adjoining north wall St. George is represented slaying the dragon without the City gates, whilst the citizens and their mayor watch with interest the result of the combat from a safe position on the City walls. A motto runs at the bottom of this and the east wall, "Our ancient word of courage, Fair St. George inspire us with the spleen of fiery dragons." It is unfortunate that the latter part comes so near the motto on the City arms, "Domine dirige nos." "Inspire us with the spleen of fiery dragons" is not what is intended, but so it reads. The subject on the north wall beyond the door is the most successful of all, and represents Old St. Paul's before the Great Fire, and this has been copied from a drawing in the possession of the Corporation. In front, St. Paul stands with his sword of martyrdom; around are heraldic words: "The Shield of Faith," "The Helmet of Salvation," and "The Sword of the Spirit," and an inscription below, "Put on the whole armour of God." The west wall is occupied by a female figure representing the Maiden City, protected by her dragons, and around her are representations of some of the old City gates: Aldersgate, Cripplegate, Moorgate, Bishopsgate, Aldgate, Bridegate, Ludgate, and Newgate. The south wall is occupied by a three-stemmed oak-tree, with conventionally-treated branches and foliage, supporting some of the arms of the seventy-seven Livery Companies. We are informed that the cartoons were prepared by Mr. Powell, and the work executed by Mr. J. A. Pippet, of Solihull. The prevailing colours are red and grey, with occasional use of blue and gold, and the tone of colour being kept low, the result is not unpleasing as a whole. With reference to the design, there is at times some room for improvement, and the drawing is distinctly tame in some instances.

THE case of Tullis *v.* Jacson, decided last week by Mr. Justice Chitty, settles a point in regard to the certificates of architects which has previously not been judicially decided. By a clause in a contract between the builder and his employers, it was provided that the architect's certificate was not only to be final and binding, but should not be set aside, or be attempted to be set aside, by reason of any technical or legal defects, or for any pretence, suggestion, charge, or insinuation of fraud, collusion, or confederacy. It is a rule of law that an architect's certificate, though generally binding, is not final if fraudulent, and it was contended in the present case, on behalf of the builders, that such a clause was contrary to public policy. But Mr. Justice Chitty decided that if parties with their eyes open agreed to such a contract, the Court would not set it aside. It is only fair to the architect to observe, by the way, that no fraud was proved, and that the question was decided on the preliminary legal point, the actual facts not being gone into. This decision is in accordance with common sense. If a person of sound mind and understanding binds himself by such a clause, clearly no court of law should release him from a contract because it turns out not to suit him. On the other hand, such a clause seems to be one which a sensible man should not agree to. It is one thing to stipulate that a fair and *bonâ-fide* certificate, however erroneous, shall bind the parties: it is quite another to agree that an unfair and a fraudulent document shall have the same effect. The honest man, in such a case, delivers himself bound into the hands of rogues, if other parties should prove to be such. The clause, in fact, goes further than a desire to avoid expense, and litigation should carry parties to a contract. But this does not invalidate its binding force when actually signed and witnessed.

THE difficulties to which railway companies are put when it is necessary to enlarge important terminal stations, is well exemplified at the present time at Euston. A new western platform was opened on the first of the present month, and it was not so very long ago that a local platform, close to the arrival platform, was begun to be used. But there is no straight and easy means of communication between these new divergent sides of the terminus, and the main entrance and central hall are of no use for the western platform, or the local platform. The result is that Euston is now one of the most inconvenient stations in England, and appears likely to become worse. It is obvious that some large and bold scheme will in no long time have to be undertaken, by which the business at the terminus can be carried on with convenience to the public and to the service of the Company. The increased space for the dispatch of the passenger trains has only been gained at the expense of the convenience of the public.

GRAY'S INN CHAPEL, which the Benchers have decided to replace with the new building to which we adverted in a "Note" last week, stands, it is generally

believed, upon the site of the ancient religious structure cited in the royal licence granted to John de Grey (1315) for assigning certain lands and rent in St. Andrew's Holborn parish, and in Kentish-town, to St. Bartholomew's the Great, West Smithfield, for a chaplain to hold divine service in the chapel of his manor of "Pourtepole" for the soul of the said John.* It seems that the chapel building assumed its present condition and size (51 ft. by 37 ft.) in the last ten years of the seventeenth century. In 1699 it was "beautified and repaired, the walls being covered with a handsome finishing," writes Hatton. A new porch and smaller turret were added in 1826, when, at the hands of, we believe, William Wigg, architect, various ill-advised alterations were made of the hall exterior, including the covering of the whole with cement, which latter is now being removed.† The north side has been reinstated, and its stone-work repaired. The bell is inscribed, "James Bartlet made mee, 1689. Samuel Buck, Treasurer." Of the windows mentioned in the advertisement, the eastern one, of five lights, contains armorial bearings of Juxon, Sheldon, and Wake, Archbishops of Canterbury; and of King, Crewe, and Morley, Bishops of Rochester, Durham, and Winchester; in 1862 the late Samuel Turner, bencher, presented three others. Some of the old heraldically painted glass, of the fifteenth and sixteenth centuries, described by Dugdale, has been removed from the chapel to the hall. We understand that the present chapel will be taken for increasing the accommodation of the hall and combination-room. The corrugated iron building, which now sadly disfigures the Inn-garden, is for occasional use as a students' class-room; its erection scared away all the rooks at their nesting time, and the birds have shown no disposition to return.

WE may draw attention to the fact that an International Exhibition of building materials is to be held this year at Lemberg, under the auspices of the Governor of Galicia. It will be opened on August 30 and closed on September 20 of this year. The exhibition will comprise all materials that are in any way connected with architecture and building. We fear this frequency of building exhibitions is not very popular with the best makers and dealers, as they gain little or nothing to compensate for the expense of exhibiting, and yet are liable to be looked on as declining in reputation if they fail to put in an appearance. However, any firms in this country which are desirous of exhibiting should communicate with Mr. A. Gobiet, Karolinenthal, Prague.

THE committee of architects elected to arrange the German Architectural Division at the Chicago Exhibition are working energetically, and mean to obtain a good collection of the work done during the last decade. Exhibitors incur no expenses except for the transmission of their drawings or models to the central office at Berlin. The Government has voted ample means for the carriage to America and back, the insurance, and all incidental charges. A jury of the seniors of the profession will decide as to the propriety of sending certain of the drawings, which will have to be ready in December and duly registered this month. Some two hundred of Germany's most interesting buildings are apparently to be illustrated separately, with the purpose of giving the visitors to the Exhibition an idea of the various classes of structures lately built; the architects of these two hundred buildings which have been selected by the jury have received special invitations to send in the necessary drawings. The German Architectural Collection is to be arranged according to system, and it is to be ready on the opening day of the Show.

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* See "Gray's Inn: its History, &c." By Mr. W. Ralph Douthwaite, Librarian. London: 1886.

† See our "Note" of October 31 last, and correspondence in our columns of that month.

IN regard to open spaces in and around London, various projects to which, in their initial stages, we have already adverted are making good progress. The Court of Common Council have voted 500*l.* to complete the purchase of West Wickham Common, 25 acres (see our "Note" of March 19 last), the property of Sir John Lennard, Bart., lord of the manor, and agreed to maintain it as an open space. A few days since the old burial-ground in Hackney-road, near St. Leonard's Church, Shoreditch, was devoted to the use of the public,—*e curis* the Earl of Meath's Association. A sum of 8,000*l.* is all that is now needed to secure the ground (21 acres) at Maida-vale, since the Marylebone and Paddington Vestries have voted grants of 5,000*l.* and 25,000*l.* respectively, and 11,000*l.* are privately subscribed by the parishioners towards the necessary total of 50,000*l.*, which should be forthcoming before the close of the year. Mr. Joseph Guedalla and Mr. Harben have, it is stated, conditionally promised to double their previous donations of 500*l.* each. This area, held, we believe, by the Ecclesiastical Commissioners, was opened as a recreation-ground on April 28, 1888, mainly through the exertions of Mr. Beachcroft, L.C.C., who has since taken a most active part in endeavouring to assure its permanent appropriation to the public benefit. The London County Council have in effect agreed to pay 4,250*l.*, a contribution promised by the late Metropolitan Board of Works, to the purchase, for 9,200*l.*, by the Kensington Vestry, of Adam's Field, in Potterylane, Notting Hill (the *Builder*, October 10, and December 22, 1888). This land, about 4¼ acres, was bought by the Vestry three years ago, the Charity Commissioners, as we read at the time, giving 2.000*l.* It has since been named Avondale Park. As regards the Lewisham Hilly Fields, over 40 acres (see the *Builder*, March 5 last), the committee ask for a little more than 3,000*l.* to balance an estimated total of 41,850*l.* Towards that sum promises are already made of 16,650*l.*, comprising 1,000*l.* from the City Parochial Charities Fund, 500*l.* by the Goldsmiths' Company, 100 guineas apiece by the Leathersellers' and the Fishmongers', 100*l.* apiece by the Grocers' and the Clothworkers', and 100*l.* by the Skinners', Drapers', and Mercers' Companies jointly. The County Council will contribute 22,000*l.*, and, as soon as the purchase-moneys are thus provided, will, it is stated, endeavour to conclude the sale at the estimated amount. At their last monthly meeting the Metropolitan Public Gardens Association resolved to move for the opening of Vincent-square (10 acres, set apart in 1810 by Dean Vincent as the Westminster boys' playfields); Soho-square; and the Eton and Middlesex (late) cricket-ground, Primrose-hill; and to lay out a plot in Marigold-street, S.E., lately given to them.

IT is truly sad to hear that, in consequence of differences between the lord of the manor and the neighbouring population in regard to some rights of way, the remains of Whitby Abbey have been closed to the public, and archæologists, architects, and artists, are thus shut out for the present from visiting a place of unusually historic interest and picturesque character. A correspondent of the *Daily News* (July 2), in directing attention to recent differences between the inhabitants and the manor-lord of Whitby, asks for contributions in aid of testing by law the right of the latter to exclude them from the Abbey, and deprive them of their ancient enjoyment. Standing at what was Streanshalh, upon the Eske's east bank, the ruins of the church are the sole remains of "high Whitby's cloister'd pile," founded in 658, by Oswy, king of Northumbria, after his victory over Penda at Leeds, and dedicated to St. Peter, for Hilda, Abbess of a convent on the Wear.* Cædmon, author of the "Paraphrase," was a lay brother here in St. Hilda's time. Destroyed *circa* 867 by the Danes, whose camp gave a name to Raven's-hill, hard by, the monastery was given by the Conqueror to Hugh, Earl of Chester, who bestowed it upon William De Percy. De Percy, as some authorities say, but, according to others, Reinfrid, a monk of Evesham, who had been one of William's followers, restored the vacant house as a priory. Henry I. largely endowed the priory, reconverting it into a Cistercian abbey,—one of the eight after that kind in Yorkshire,—for nuns and monks Benedictine, with precedence, as before, to the abbess. In 1175 Whitby again suffered pillage, at the hands of some Norwegian marauders, but so far recovered as ultimately to enjoy a net income of 437*l.* 2s., *teste* Dugdale, at its surrender. In 1555 the monastery was bought by Sir Richard Cholmley, whose son, twenty-five years later, built the adjoining Whitby Hall, with, it is said, the materials of the monastic buildings. The oldest part of the church is its Early English choir, erected by Richard, formerly of St. Peter at Burgh, abbot, 1148-75; the remaining transept (north) is later, and most of the nave, whose west side fell down in 1763, is Decorated. The central tower, 106 ft. high, came to the ground on June 25, 1830. The church's dimensions are thus given in L. Charlton's book (York, 1779, 4to): length, 300 ft.; breadth, 69 ft.; cross aisles, 150 ft.; height of nave, 60 ft.; and of tower, 150 ft. Captain Cook, the great navigator, first saw sea-service as a three-years' apprentice on board of a Whitby collier. It is to be hoped that the enclosure of Whitby is only temporary.

* She was King Eadwine's niece. Oswy is said to have taken as his model York Minster, as rebuilt of stone, *circa* 635.

THE New York *Electrical World* gave recently an account of the state of the works that are being carried out for the utilisation of Niagara Falls as they existed at the commencement of the year, and also the proposed machinery which is to be installed later. The main tunnel, which will form the tail-race for the turbines, was begun in October, 1890, and is now intended to be finished shortly. It is 18 ft. 10 in. wide and 21 ft. high, and is brick-lined throughout. It has been driven from three points, namely, from the outlet below the Falls, and from two shafts, 260 ft. and 196 ft. deep respectively. The grade is $\frac{7}{8}$ per cent. The total capacity of the plant will be 100,000 horse-power; and this is proposed to be obtained from a series of turbines of 2,500 horse-power to 5,000 horse-power each. The turbines will be placed on the American side of the river, about a mile above the Falls, and part of the power is to be utilised in the immediate neighbourhood, mills being erected for the purpose. For transmission of power to a distance, either electricity or compressed air will be used; no wire rope transmission being contemplated. Each mill will have its own vertical shaft and turbine, with tail-race connected by a service tunnel to the main tunnel. The water will be conveyed to the turbine by a separate supply-pipe entering the turbine wheel from below, so as to balance the weight of the wheel and vertical shaft. The available head is 130 ft. At present plant for 15,000 horse-power is to be erected, some for driving air-compressors, and some for driving dynamos. The City of Buffalo is to be supplied with electricity generated by means of the power from the Falls. The pressure will probably be 10,000 volts on the line to Buffalo, but for distribution in the city it will be reduced to 1,000 volts. Even this is a high voltage, but personal safety is less carefully guarded in America than in this country, where people are not taught to look out for themselves to the same extent.

THE City Hall of Philadelphia, which forms so conspicuous a feature (too-conspicuous!) at the crossing of the principal thoroughfares of the city, has a central tower which, when completed, will be 500 ft. high. The top is to be ironwork, the rest being of white marble. About 100,000 square feet of the ironwork are to be plated

with aluminium. The Tacony Iron and Metal Company of Philadelphia have recently succeeded in the electro-plating of the 6-ton cast-iron columns, 20 ft. high, which form part of the design. The process is as follows:—The castings to be plated are first soaked for a day in caustic soda to remove grease, and they are then pickled in acid for another day to remove scale and rust. The parts are then thoroughly cleaned with steel brushes, after which they are ready for plating. A heavy coating of copper is first applied, and on the top of this is deposited the aluminium to a thickness of a sixteenth of an inch. About forty-two tons of the metal will be required to complete the plating of the iron.

THE ARCHITECTURAL ASSOCIATION'S VISIT TO ELTHAM.

ON Saturday last a large number of members of the Association went down to Eltham, attracted by the visit which had been arranged to Colonel North's residence at Avery Hill.

The party first of all made a visit to the remains of the old Palace of Eltham.

This grand ancient structure has much of historical interest. As early as 1270 it was used by Henry III.; it was enlarged about the close of the thirteenth century by Anthony Bick, Bishop of Durham, and then became the residence of Edward II. Here his son was born, from this circumstance called John of Eltham, and the palace, erroneously, King John's Palace. Edward III. held Parliaments here in 1329 and 1375, and in 1364 sumptuously entertained his prisoner, King John of France. The festival of Christmas was here celebrated by Richard II. in 1384 and 1386, and by Henry IV. in 1405. Edward IV. repaired the palace and enclosed one of the parks, and Henry VII. built a front to it and otherwise improved it, and it continued to be the occasional royal residence during the reign of Henry VIII., who celebrated two splendid festivals in it, after which time it began to yield in importance to Greenwich, which in the reign of Elizabeth obtained the ascendancy. During the Civil War in the reign of Charles I., Eltham was occupied by the Earl of Essex, the Parliamentary general, who died here in 1646. Of the extent of this once magnificent pile some idea may be formed by the Parliamentary survey, in which it is described as having "one fair chapel, one great hall, forty-six rooms, and offices below stairs, with two large cellars; and above stairs, seventeen lodging rooms on the King's side, twelve on the Queen's side, and nine on the Prince's side, thirty-five bayes of buildings, or seventy-eight rooms in the offices round the courtyard, which contained one acre of ground." Of these, the chief part remaining is the great hall, 100 ft. long and 36 ft. wide, having ten windows on each side, and one of the finest examples of hammer-beam roofs in the country. The hall was, for many years, used as a barn, but has been repaired and shored up for preservation. There are also the ancient stone bridge, portions of the walls and subterraneous passages, and parts of the interior offices converted into modern buildings, and, with the surrounding lands, constituting what is called Court Farm. The area is enclosed by a stone wall of great thickness, with additions of brick, probably made in the time of Henry VII., and from 18 to 20 ft. in height. The moat by which it was surrounded was from 70 ft. to 80 ft. in breadth, and from 14 ft. to 15 ft. in depth. It is quite dry, and, though converted into a garden, its original form may be distinctly traced. A very fine collection of roses in the moat-garden was seen by the visitors, who appreciated the horticulture as well as the architecture. Mr. Edmund Woodthorpe, M.A., who acted as secretary for the visit, read in the hall a short account of the chief historical events relating to the palace, and excited the imagination of his hearers to recall the aspect of Eltham in its glory.

Leaving the Palace, the party proceeded through Eltham and along the Bexley-road till they reached Avery Hill, where they came upon the residence, which has been so much talked about, both from the well-known name of its owner, Colonel North, and from the *cause célèbre* furnished by the disagreements of that gentleman and his architect. The general character of the house is more remarkable for the large sums of money expended, than for high artistic results. It is perfectly evident throughout the work that the designers, both architect and others, have not had sufficient time for giving that thought which the expenditure of large sums of money in a comparatively limited area necessitates, if vulgarity is to be avoided. On the one hand, homeliness, quiet, and refinement have been lost, while magnificence and splendour have not been attained to a degree commensurate with the large expenditure of money. Beautiful materials, and in many cases beautiful workmanship, are lavishly displayed throughout the house, the Mexican onyx, for example, being probably some of the finest specimens of that marble to be seen in the world. The most characteristic features of the house are the conservatories, both for flowers and ferns, the winter garden, and the picture gallery. The conservatories and winter garden are of large size, the latter being 100 ft. by 100 ft., and are admirably arranged, and planted to provide as near an approximation to constant open-air life as our climate will permit. The picture gallery is known by repute to most of our readers, and is one of the few places where it is possible for a private individual to own and display the enormous canvases in which some of the modern Italian painters delight. A very pleasant luxury is the Turkish bath adjoining the owner's bedroom, fitted up in a suitable fashion with faïence of a Moresco character of design. The stables are naturally one of the most satisfactory parts of the whole, as while everything is of the very best, there does not appear that extravagance which detracts from one's enjoyment of the house itself. The engine and boiler house, with the electric lighting machinery, also interested many of the members. Colonel North met the party, and conducted them through the house, pointing out the special features, and entertaining the visitors with some racy stories and remarks. The views from the upper windows were especially admired, and are, indeed, remarkable for a house only nine miles from London.

THE ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.

CONTINUING our digest of the proceedings of this Commission,* we may conveniently state the broad features of the bulk of the evidence taken at the later sittings. Passing away for a time from questions of population and supply per head, the Commission have taken up that of the pollution of the Thames and of the Lea. The question divides itself into two problems. The first relates to the actual character and amount of visible and material pollution and the possibility of reducing it. The second relates to the effect of that pollution upon the water as determined by analyses, by experience as to the spread of diseases attributed to polluted water, and by scientific research as to the vitality of disease germs and the efficiency of sewage treatment and filtration in getting rid of them. The last stated branch of the inquiry is complicated by the suggestion that the use of chemicals in the treatment of sewage may injure the quality of the water which receives the effluent. Positive evidence as to material pollution has been given by Dr. Ashby, after inspecting the Thames and its tributaries below Oxford; by Dr. Fosbroke, after going over the Thames and its tributaries above Oxford; and by Dr. Geo. Turner, after examining the Lea and its tributaries. Scientific evidence was first given by Mr. C. E. Groves, Consulting Chemist to the Thames Conservancy. It was given incidentally by Dr. Ashby and Dr. Fosbroke, and directly by Dr. Frankland, the Water Examiner; Mr. Shirley F. Murphy, Medical Officer of Health to the London County Council; and Mr. W. J. Dibdin, the Chemist to the Council. Mr. Murphy deals with deductions from statistics of mortality, and Mr. Dibdin with an enormous number of analyses, the mere statistical tabulation of which occupies some sixty foolscap pages. In addition to all this evidence, the Commission has received a preliminary report from the Royal Society, which has been conducting an inquiry into the bacteriology of water at the instance of the London County Council, who are to bear one-half the cost; and a further report from the Royal Society is expected in October. On account of this inquiry by the Royal Society, the Commission have refrained from conducting a similar inquiry on their own account.

These facts came out in a conversation with Mr. W. H. Dickinson, Deputy-Chairman of the London County Council, when he attended the Commission to present the statement and resolutions of the Council, which have been already published in full in the *Builder* *. In reply to questions, he said that the Council ought to provide for all those generations of ratepayers who will be paying their share of any capital expenditure incurred. It was possible that a municipal authority might do more than a company to prevent waste, but at the same time it would have to meet a heavier demand for free fountains, and the public use of water. The question of quality had been before the Water Committee of the Council, but they concluded that they ought not to make any reference to it in their statement, because such antagonistic views were laid before them as to the quality of the water of both the Thames and the Lea that it was impossible for them to come to any definite conclusion; they felt that it must be left to be thrashed out by the Commission. They knew that considerable pollution was received by the rivers, and, before resolving that water should continue to be taken from them, they felt they ought to be satisfied that the pollution could be rendered perfectly harmless.

Sir Thomas Farrer, as ex-chairman of the Water Committee, also presented himself before the Commission. He said that one fact had come out which was not at first patent to the Water Committee, and that was the enormous demand made by the populations of Hertfordshire, Buckinghamshire, and Surrey, for the water which had hitherto formed a part of the supply of London, so that those populations would resist further appropriations for London unless they shared in the supply. He was permanent secretary at the Board of Trade when the Conservancy took charge of the Upper Thames, and it was with him a matter of doubt whether the large payments made by the companies did not go towards maintaining the upper navigation rather than providing a water supply for London.

Mr. G. J. Symons, F.R.S., who has made a special study of rainfall, was examined upon a statement he had made upon that subject. He stated that the area of the watershed of the Thames above the intakes of the water companies was 3,542 sq. miles; the mean rainfall was 28·5 in.; for 975 sq. miles it was 32 in.; for 2,345 sq. miles it was 27·5 in.; for 222 sq. miles it was 24 in. The area of the Lea above the intakes was 497 sq. miles; the mean rainfall was 26 in.; 350 sq. miles had a mean rainfall of 27 in.; and 147 sq. miles had a mean rainfall of 24 in. The figures as to the Thames embody the results of many thousands of observations, extending over many years. The driest year of the series, 1854, yielded 68 per cent. of the mean ratio.

It is convenient in our digest to keep the evidence of facts distinct from scientific deductions and opinions, and we, therefore, eliminate the latter from the evidence descriptive of pollutions.

Pollutions of the Lower Thames.

We have already given a summary of the report of Dr. Ashby upon the pollutions of the Thames from the intakes of the Companies up to Oxford, with many typical examples. Examined upon his statement, Dr. Ashby said that the effluent of Uxbridge was discharged under water at West Drayton. The effluent, even when diluted with the Colne water, was very offensive. It was quite impossible to get the effluent unmixed with the Colne water, and the mixture was very offensive. The effluent from Oxford was very foul and stinking, and the bed of the stream was very bad indeed. There were heaps of sludge where there was an opportunity of sewage matter running off the land into the stream. He had often found large deposits of offensive sludge from village sewers in ditches leading to a stream. Sometimes they would be washed away only when there was a fall of rain. These deposits gave an opportunity for disease organisms to breed in them. Of trade pollutions he thought tanneries and fellmongers' yards were the most dangerous. The discharges from them were often exceedingly offensive, and contained highly polluting organic matter. There was danger in effluents from all sewage farms. A town

* See last volume of the *Builder*, pp. 418, 435, 456, 480, 503; and current volume, pp. 10, 29.

* See *Builder* for July 2, pp. 15, and 16.

should do the best it can to prevent the fouling of a river, but it ought to have the right to send its purified sewage into it. Asked about Marlborough and its college, Dr. Ashby said the whole of Marlborough drained into the river, which, when he saw it, was in an abominable state. The rates were low, and there was no sewerage rate; and it was said that the death rate was very low too. What was done in many places was often the best for the health of the district, although it might be a contravention of the Rivers Pollution Act, which was more or less of a dead letter. We could not go back and keep all pollutions out of the Thames, and, with so many chances of pollution, it must be a more or less dangerous source of supply. It ought to be purified to such an extent that its proper use as a pleasure resort should not be interfered with, and, although much had been done to improve it, it is an undesirable and unsafe source of supply.

Pollutions of the Upper Thames.

Dr. Geo. Haynes Fosbroke, Medical Officer of Health for the County of Worcester, in his statement said that he had made a special study of the subject of water supply, and at the request of the London County Council he had examined the Thames and its tributaries above Oxford, including the river Cherwell. In this examination he had traversed 400 miles. He had ignored small watercourses, unless they contained impurities derived from towns or villages of importance. He submitted two maps of the Thames basin, and, by means of a number for each source of pollution, he referred to a voluminous appendix, setting out more details than could be embodied in the statement. The only places of any size passed by the Thames itself are Cricklade and Lechlade. The following are named as the tributaries of the Thames, their length exclusive of sinuosities, the places where they are received by the Thames, and the principal towns and villages they pass. The Cherwell is included by request of the County Council, although it falls into the Thames just below Oxford. On the north side are:—

The Churn, about 20 miles, received just below Cricklade,—Cubberley, Colesborne, Rendcombe, Cirencester and South Cerney.

Ampney Brooks, 19 miles, near Castle Eaton,—Polton, Marston Meysey and Ampney Crucis.

The Colne, 27 miles, near the Round House above Lechlade,—Andoversford, Wittington, Colne St. Denis, Bibury, Quennington and Fairford.

The Leach, 18 miles, just below Lechlade,—North Leach, East Leach and Southrop.

The Bampton Brooks, in the district of Tadpole Bridge,—Bampton (1,300)—include the following four streams,—

The Windrush, 34 miles, at New Bridge,—Naunton, Bourton-on-the-Water, Burford and Witney.

The Evenlode, 32 miles, near to Cassington,—Moreton-in-the-Marsh, Kingham, Chipping Norton, Shipton, Ascot, Charlbury, Handborough and Woodstock.

The Glyme, 7 miles, and the Durne, 8 miles.

The Cherwell, 35 miles, immediately below Oxford,—Croperdy, Banbury, Kings Sutton, Heyford, Islip and Bicester. This receives,—

The Ray, 14 miles, at Islip.

On the south side are,—

The Ray, 10 miles, at Castle Eaton,—Swindon.

The Highworth streams, above Lechlade,—Highworth.

The Cole, 12 miles, just below Lechlade,—Shrivenham and Coleshill.

The area of this watershed of the upper Thames is 1,222 sq. miles, including 347 of the Cherwell basin. The population, in eight counties, was, approximately, 197,036 in 1881. In describing the geology of the basin Dr. Fosbroke mentions the area,—300 sq. miles,—and the varying thicknesses of the porous oolite formations, because much domestic sewage is disposed of by being cast on to the soil, which, being so spongy, absorbs it with avidity. A large portion of the rainfall of the oolite and forest marble formations descends to the fullers earth, and the accumulation is brought to the surface by means of geological faults which form large and never-ceasing springs at Boxwell, Ewen, Ampney, Bibury, Ablington, and Winson, and intermittent springs at Winterwell, Thames Head, and Trewsbury Quarry (called also Thames Head). An engine at Trewsbury supplies the Thames and Severn Canal. In the driest summer the engine has never been able to exhaust the water. For many months the engine has thrown up 2,880,000 gallons daily, at a temperature of 50 degs. F., which is said never to vary. The dry weather or perennial flow of the Thames is spring water. There are no lakes or large marshes to store up flood waters of excessive rains. The Thames and Severn Canal forms a junction with the Thames at Lechlade; the North Wilts Canal near to Cricklade; and the Oxford Canal with the Cherwell at Bletchington. Referring for details to a voluminous appendix, Dr. Fosbroke proceeds to deal with: I. Sewage pollutions:—(1) Town drainage, (2) village drainage, (3) dwelling-houses, (4) house-boats. II. Flow from manured lands and cattle sheds. III. Sheep-washing. IV. Trade pollutions:—(1) Mills, (2) tanneries, (3) breweries, (4) barges, (5) slaughter-houses. V. Dead bodies of animals. He says:—A considerable portion of the watersheds of the Thames and Cherwell is composed of geological formations, extremely porous, and specially adapted for the absorption of moisture. Owing to this property these strata form excellent gathering grounds for water,—that is, so long as the soil on which rain falls is not exposed to contamination; but when, as is so often the case, refuse of all kinds is allowed to waste away in cesspools, ditches, or over the surface, the ground becomes so impregnated with filth that it can no longer be regarded as a first-class collecting area for water destined for domestic use. The porous state of the oolite in Oxfordshire and Gloucestershire is utilised by the population of these districts as a means of sewage disposal. It is a common practice in many localities to pour domestic and trade refuse into the fissures (designated "mines" or "lissoms") in order that it may easily be got rid of. The old adage "Out of sight, out of mind," is particularly applicable to the sewage disposal of such towns as Woodstock, Northleach, and Stow-on-the-Wold, where efforts are made to tap the fissures so that filth may be dealt with without recourse to drains or sewers.

Some conception of the size and depth of the cracks in the rock will be formed when I say that a person residing at Northleach told me for years he never heeded what became of his privy refuse; it was enough to know that the vault, although in his house, never required cleansing. One day his child fell through the closet seat, and he then became curious as to what might have happened had not rescue been at hand, and on search he found, just below the closet, a chasm which he could not gauge, but down which the child might have been irretrievably lost. I visited many villages in Gloucestershire and Oxfordshire where there is no system of sewage disposal, and even house-drains are considered unnecessary, as the soil so readily absorbs any liquid refuse which may find its way on to it. In districts unaffected by river fluctuations this porous state of the soil is much prized, but in the alluvial areas this merit is not so highly esteemed, for it is found that the cesspools are materially influenced by the height of the streams. These few remarks will show to what an extent the rivers and springs in the Upper Thames Basin may be affected by polluting sources, which cursory observation would lead one to believe are unimportant. When sewage is poured into subterranean passages, such as I have described, it is manifest that should specific infection occur, the danger to those drinking the water is by no means mythical.

The towns of Swindon (New and Old), Banbury, Bicester, and Cirencester dispose of their sewage by broad irrigation of land. The sewage from the village of Wroughton is treated in the same way. The effluent from the Old and New Swindon (particularly the latter) and Banbury farms seriously pollute the adjacent streams, and the same thing occasionally happens at Bicester. The Cirencester farm and the small one at Wroughton do not appear to do so,—at any rate, if they do, it cannot be often, as the land is well adapted for local requirements, and seems to be properly looked after. The town of Swindon is governed by the Old Swindon Local Board and the New Swindon Local Board, and the respective sewage farms are placed on the eastern bank of the river Ray, which joins the Thames just below Cricklade. The Old Swindon farm is nearer to the source of the stream than at New Swindon.

I found (March 6, 1891) that the river Ray showed signs of pollution immediately it received the effluent from the Old Swindon farm, but that after the reception of that from the New Swindon farm, it became little, if any, better than an open sewer, and until it flowed into the Thames maintained this appearance. Below New Swindon the nuisance from the river and the farm has latterly been so great as to cause considerable local agitation. At the point where the Ray joins the Thames, I noticed (March 5, 1891) the water from the former was much discoloured, and seemed to flow side by side with that from the latter for some considerable distance before mingling took place. Some idea of the serious import of this pollution will be formed when I say that it is estimated that there are about 6,000 water-closets in the town of Swindon, and that the population is increasing from year to year.

The Banbury sewage-farm is on the left bank of the Cherwell, and has a clayey subsoil. On the day of my visit (March 18, 1891), the effluent water, as it joined the river, was black and offensive, and discoloured the stream for a distance of some 120 yards. Dr. Dibdin, in reporting upon a sample I collected in the presence of the farm manager, speaks of it as "very turbid, yellow colour," "quantity of black, earthy-looking deposit," "sewage odour."

Two years ago very large quantities of fish were destroyed by the discharge of sewage into the river, and in summer time, even now, the sewage is said to pollute the stream as far as Twyford Mill, about one and a-half miles from the town. The population of Banbury is estimated to be 12,700, and is believed to be increasing. Water-closets are in general use. The sewers receive surface water, and (I am informed by the Borough Surveyor) a considerable quantity of subsoil drainage also, and discharge their contents into tanks, whence the sewage is pumped to the farm after "screening." In one part of the town the "separate system" is in vogue. In times of heavy rain the overflow sewage goes direct to the river.

The Bicester Sewage Farm deals with the sewage of a population estimated to be 3,600, and is placed on the left bank of the Oxfordshire Ray. The fields irrigated are meadow land close to the stream; indeed, one of the main "carriers" is so close to the water that rat-holes frequently lead sewage into it. It is evident from the soiled condition of the effluent carrier that purification is not always complete, although on the day of my inspection (April 8, 1891), there was little to complain of. There are about 100 water-closets in the town.

The number of towns where attempts, more or less successful, have been made to treat the sewage by passing it through land before it is discharged into rivers, is small. Very many places are entirely unsewered; others have surface-drains which, when originally laid down, were intended for road-water only; but in course of time dwellings have been connected with them, and they now serve the additional purpose of carriers of house refuse. It is impossible to estimate the amount of the liquid which finds its way directly into the watercourses by these means, since much soaks away into the subsoil. Generally speaking, these surface-drains are unsuited for the reception of fœcal refuse, so, as a rule, cesspools, connected with them by overflow pipes, have been constructed to intercept the solid matters.

The following places pollute the streams in this way:—Ashton-Keynes, Cricklade, Lechdale, Faringdon, Eynsham Village, South Cerney, Fairford, Northleach, Naunton, Bourton-on-the-Water, Great Barrington, Burford, Witney, Moreton-in-the-Marsh, Chipping Norton, Shipton, Charlbury, Woodstock, King's Sutton, Highworth.

At Faringdon the sewers are of irregular construction and convey the sewage and storm-water into the "sewer ditch" (a watercourse of considerable dimensions) which discharges into the River Thames just below Radcot Bridge, after a course of about four miles. As the ditch approaches the Thames it is said oftentimes to be very offensive, and a nuisance to those passing along the highway.

At Witney, the sewage is collected by surface-drains (of stone or pipes), and conveyed into a tank of small dimensions at the rear of Hudson's Yard. The overflow from the tank discharges crude sewage into Gunn's Hole ditch, which flows through Emma's Dyke to the Windrush, after a course of about one and a-quarter mile. At the lower part of Emma's Dyke, sewage fungus was obvious.

I desire to call attention to the result of the action, "The Thames Conservancy Board *v.* the

Witney Local Board," reported in the *Witney Express* of September 29, 1881, as it shows how difficult it is to prove pollution of streams. In this case chemical evidence was adduced to the effect that "the water of Emma's Dyke at its outfall (one and a-quarter mile below the sewage outlet) is as good, and, if anything, a little better than the water of the Windrush itself," and that "not the slightest injury is likely to arise from any particle of the Witney sewage reaching the Thames." In connexion with the pollution caused by Witney, that due to the blanket refuse should not be forgotten.

At Chipping Norton the sewage includes ordinary house refuse, and the whole of that from the Tweed Mills and a tannery; and it is discharged into the brook which flows a distance of about four and a half miles (exclusive of sinuosities) to join the Evenlode, just below the village of Kingham. At the Tweed Mills it is extremely foul, and nothing more than a common sewer. The addition of the dye refuse and gas-works drainage further pollute it. The day I inspected the stream (March 21, 1891) it was black and offensive. At a point some two and a half miles below Chipping Norton I noticed large volumes of deep dye refuse. The brook is much complained of, not only by the tenants of Churchill and Kingham Mills, but also by a gentleman who resides at the Manor Farm, Ascot, some miles lower down the Evenlode. Apparently there are no fish. The polluted condition of this stream has been brought under the notice of the County Council of Oxfordshire, but no steps have yet been taken to remedy the evil. With regard to the pollutions designated "of minor importance," I wish it to be clearly understood that, although so described, I consider them objectionable where the river-water is ultimately used for domestic purposes. I have so classified them, because their extent is apparently small. In the course of my inspection I visited numbers of villages and dwelling-houses on the banks of the streams, which pollute in rainy seasons only, as the ditches store the filth, until scoured by storm water. It is impossible to estimate the number of such places, as they are legion. A "direct" sewage pollution, of which I have not yet spoken, is that caused by privies placed at the water's edge. At one time, I believe, it was a common occurrence for closets to empty into the stream; but, owing to the action of the local sanitary authorities, such a nuisance has been, in a great measure, abated. I did, however, notice some, scattered throughout the watersheds, constructed on this plan, and several others, whose uncemented vaults were in close proximity to watercourses. The total number of w.c.'s in the towns and villages adjacent to the streams I visited may roughly be computed to be between 8,000 and 9,000.

The pollution by the water which has passed over manured lands is very considerable, especially in times of heavy rain-fall. Some idea of its extent may be formed from the circumstance that, at the Wolvercot and Eynsham paper-mills, impounding reservoirs have been constructed to supply water during flood times, as that then available is too foul for trade purposes.

The following are approximate estimates of the proportionate amounts of arable and pasture land, and the number of live stock, in so much of each county as lies within the basin of the Upper Thames:—

County.	Arable Acres.	Pasture Acres.	Total Number of Arable and Pasture Acres.
Gloucester	78,463	99,736	178,199
Oxford	236,488	174,369	410,857
Wilts.....	96,685	109,446	206,131
Bucks	110,567	142,785	253,352
Berks	224,374	151,984	376,358
Northampton..	16,790	24,745	41,535
Warwick	8,240	14,699	22,939
Worcester	35	51	86
Total.....	771,642	717,815	1,489,457

On this area there are 60,164 horses, 219,758 cattle, 943,014 sheep, and 151,143 pigs.

From these statistics, it may fairly be concluded that the acreage of arable land somewhat exceeds that laid down as pasture; and for this reason the Thames basin is not as eligible a collecting area as if grass land preponderated. At the outset I was inclined to accept this view, but as my inquiry proceeded, I became convinced that it was not of so much importance; inasmuch as I found that it is common custom in these counties to manure grass heavily. I do not think that human excrement is largely used for this purpose. In addition to this, irrigation of the meadows adjacent to the streams is largely resorted to, and the consequence is that impurities find their way into the watercourses in considerable quantities. The agricultural returns just quoted show that no less than 1,374,079 horses, cattle, sheep, and pigs, were to be found in the counties of the Upper Thames and Cherwell last year. This vast number of animals in summer time frequent the meadow land adjacent to the watercourses, and, as almost every field in proximity to a stream has a cattle drinking-place, the pollutions furnished by them are considerable. Again, sheds in which the cattle are housed during winter are not uncommonly drained into the rivers. Bearing these facts in mind, and also that heavy rains scour large numbers of sewage-polluted ditches, permeate cesspools, and sweep over manured lands, it is not surprising to find that the flood-waters of the Upper Thames Basin are so discoloured and contaminated that they cannot be used even for trade purposes.

Another source of pollution to the smaller streams more particularly is sheep-washing. As this operation was going on at the time I visited some districts, its injurious effects were readily discernible. When in full swing, I understand it discolours the watercourses for long distances.

Trade Pollutions.—1. *Mills:* The mills are of four kinds: (a) corn, (b) paper, (c) blanket, (d) flock. (a) Corn Mills. There are no corn mills on the Thames below Cricklade, but many are to be found on the tributary streams. Although numerous, the number has decreased. This I understand is not so much due to the loss of water power as to agricultural influences, which tend to centre them round places where railway facilities are available. Corn mills, *per se*, do not pollute streams, but in most instances the slop-water, and occasionally privy refuse from the employés dwellings are discharged into the water. I have, however, included them under "Sewage Pollutions." (b) Paper Mills.—There are only two paper mills in the Upper Thames Basin, one being at Wolvercot and the other at Eynsham. The latter has been closed for the past three months, but it seems probable that it will be re-opened after a time. (After describing the process of paper-making, he says:—) "The third refuse consists of the alkaline waste liquor, with all matters dissolved by it from the rags, straw, and esparto grass, and the water from the engine. When washing is complete, the pulp is bleached by means of chloride of lime. The bleaching-powder employed is heated with water in vats, and the insoluble lime is allowed to settle. This sediment is the fourth refuse of the paper maker; the clear bleach liquid is brought into contact with paper pulp and left so for some time. The bleaching process is one which if not carefully managed is likely to lead to great injury to streams, especially in the destruction of fish. The esparto washings, 'third boilings,' and liquid from the rolling-mills, are discharged into the stream, but the "first" and "second" esparto "boilings," which contain much caustic alkali, are passed into an "evaporator," by means of which a considerable quantity of the alkali is recovered. On the day of my visit (April 17, 1891) there was decided evidence of pollution, which, of course, would have been worse had not the "evaporator" been in use. Apparently the whole of the refuse not evaporated, or taking the form of sludge, reaches the river. There seems to be a local impression that the pollution from Eynsham Mill is less than formerly. (c) Blanket Mills.—The four mills which constitute the industry of blanket-making were met with in the neighbourhood of Witney. The processes giving rise to pollution in these trades are those of "scouring" and "dyeing." In the former, quantities of stale human urine, mingled with pig dung and soap-suds, are made use of. The refuse from two mills (New Mill and Crawley Mill) is discharged directly into the Windrush, but at Witney Mill,—the only manufactory in the district where dyeing is carried on,—the waste-water is received into tanks, and treated with ferric-alum before it is poured into the river. At the fourth mill there are no waste products. The discharge of quantities of scouring water into the Windrush is bad enough, but the addition of stale urine and pig-dung intensifies the evil. (d) Flock Mill.—When the Cirencester Mill is in full work, about 14 cwt. to 15 cwt. of rags of all descriptions are converted into "flock" per week, but the trade is intermittent. The process consists in the washing of the rags and their subsequent reduction to "pulp." No chemicals are used. The water used in washing is drawn from and returned to the river without purification, consequently a considerable amount of filth must be passed into the Churn in this way.

2. *Tanneries*.—The tanning process may be considered under two heads,—(a) That of cleansing the skins and removing the hair, usually effected by the "Fellmongers"; (b) The subsequent exposure of the hides to the tanning principle. The hides treated by fellmongers are either English or foreign. The former are usually soaked in clean water for about twenty-four hours and then treated with lime; but the latter are immersed in "lime-pits" for about three weeks. Subsequently they are hung up to dry, and after the removal of the hair or wool, are known as "pelts," which are next soaked in the lime-pits and then handed over to the tanner.

The tanner dresses the hides with alum, salt, dogs' or hen dung, and exposes them to the tanning principle (derived from oak-bark or other sources), and converts them into leather. I met with fellmongers' yards on the banks of streams at Cricklade, Fairford, Faringdon and Chipping Norton, and tanneries at Burford, Bicester and Chipping Norton. The total number of hides dressed on an average each week, is about 1,100. The whole of the waste water from these yards reaches the streams, and in one instance amounts to from 3,000 to 4,000 gallons daily. The pollution the rivers thus sustain is most objectionable.

3. *Breweries*.—The breweries in the Upper Thames Basin, which cast their refuse directly into the streams, are few and unimportant, and were met with at Chipping Norton, Witney, Faringdon, Burford, King's Sutton, Highworth and Ampney Crucis. The pollutions attributable to these industries were not specially obvious.

4. *Barges*.—The number of barges which pass along the Upper Thames is so few that the pollutions they cause are unimportant. None go higher up stream than New Bridge, which place they cannot easily reach unless they are "lightened." The cargoes are principally coal and stone. Night-soil (excrement) does not seem to be transported in this way. House-boats seldom pass higher up stream than Oxford, and only one was met with, or even heard of, in the reaches of the Upper Thames.

5. *Slaughter-houses*.—The garbage and blood from the slaughter-houses are usually consumed by the butchers' pigs; nevertheless much liquid refuse finds its way into the streams, either through street-drains or by more direct channels.

Slaughter-houses at the edges of streams were met with at South Cerney, Fairford, Woodstock.

It scarcely seems within the scope of this statement to allude to the quantity of water which is discharged from the watersheds of the Upper Thames and Cherwell, as the question essentially belongs to the province of an engineer, and not a medical man. I may, however, say that apparently the summer flow of these rivers is not so great as formerly. In several instances the low state of the water last year was alluded to by millers and others interested in water-power; no doubt, however, the restricted flow in 1890 was exceptional. I have previously said that the number of corn-mills is decreasing, but I only heard of one (at Woodstock) where the closure was due to scarcity of water. Agricultural drainage, now so general, no doubt causes the flood waters to pass off more quickly than was the case years ago, and consequently the rainfall is not stored up, and gradually released as it used to be. Almost every person I asked told me that, owing to the action of the Thames Valley Drainage Commissioners, the floods were not now nearly as persistent, nor as prolonged, as they were in years gone by.

I have shown, in my previous remarks and in the appendix, that the rivers and streams of the watersheds of the Upper Thames and Cherwell receive the drainage from many towns, villages, dwelling-houses, farm-yards, and industries, including that from between 8,000 and 9,000 water-closets. In consequence, a great amount of refuse reaches the water more or less directly, and in times of flood this is much intensified and particularly obvious. I have no doubt but that the pollution will be augmented as the population continues to in-

Cottages, South Petherton, Somerset.—Mr. Roland W. Paul, Architect.

crease, and as the water-carriage system of sewage removal becomes more general.

There can be no doubt that in many of the places named in this statement as polluting the river water, a good deal could be done to improve the present state of affairs; but on the other hand, at numbers it would be quite impracticable to do so. There would, therefore, under the most hopeful circumstances still remain a considerable risk of specific pollution of the river. Considering that the watersheds of the Upper Thames and Cherwell have an estimated population of some 205,000, that it is probable that the present pollutions (especially those furnished by excrementitious refuse) will increase, and that it would be impossible to avert the danger of specific pollution, even by filtration, I am firmly convinced that water drawn from such sources cannot be used for ordinary domestic purposes without great risk.

In examination, Dr. Fosbrooke said that some localities were unsewered, but then sewage was readily disposed of by being allowed to soak away to "mines" or "lissoms." Some of these were porous cesspools near to the river, and he named these as conjectural pollutions. The Glyme might be polluted at Woodstock by the sewage of the town being poured into these mines or lissoms. The way of dealing with sewage at Woodstock was to find a crack and to connect cesspools with it, and the cracks carried off liquid refuse. Streams polluted as he had described, were "undesirable" sources of supply—he did not say "unsafe." Swindon sewage goes into the Wiltshire Ray, and after travelling four miles in that stream it can be seen for 200 yards in the Thames, before mingling completely with its water. Mr. Hill pointed out to the witness that the aggregate population of the towns without sewage farms was just over 33,000, so that it was rather "strong" to speak of the houses that stored their filth in ditches as "legion." The population appeared to be 168 to the sq. mile, so that the proportion of sewage to area was small. Reminded that the proportion of animals was one per acre, he repeated that animal pollution was not an important one; and the pollutions from manufactures were preventible, and could be suppressed with sufficient powers.

The Lea and its tributaries are the subject of equally exhaustive treatment by Dr. Geo. Turner, whose conclusions we reserve until next week, when we propose also dealing with the evidence of Dr. Frankland and other analysts.

COTTAGES, SOUTH PETHERTON.

THESE cottages, occupying high ground about half a mile east of South Petherton, have recently been completed for Mr. W. F. Blake, from designs by Mr. Roland W. Paul. They are built of Ham Hill stone throughout, with the exception of the chimneys, which are of brick. The bricks and the tiles (of the patent "weatherproof" pattern) were supplied by Messrs. Major & Co., of Bridgwater. The builders were Messrs. H. J. Yandle & Son, of Martock.

MUNICIPAL ENGINEERING AT SCARBOROUGH.

THE Incorporated Association of Municipal and County Engineers (Northern Counties and Yorkshire District) had a very successful meeting at Scarborough on the 18th ult. They were received and welcomed at the Town-hall by the ex-Mayor, on behalf of the Corporation, in the unavoidable absence of the Mayor, who was away from Scarborough at the time.

Mr. T. De Courcy Meade, the President of the Association, having thanked the ex-Mayor for the welcome accorded to the Association, Mr. Howcroft was elected Hon. District Secretary.

Mr. G. Ball then read a paper, written by Mr. Joseph Petch, the Borough Surveyor, on "Scarborough, its Progress and its Public Works in Recent Years," which he commenced by saying that an account of all the works of improvement designed and executed by him during the twenty-two years he has held the office of Borough Surveyor would be too much to attempt to describe in detail on this, the first visit of the Association, therefore the works more particularly mentioned in detail had been executed during the past ten years. After giving a brief sketch of the history of the borough, which was incorporated A.D. 1100, by a Charter from King Henry I., he said the place derived its name from Scar, a cliff, and Burgh, a castle, "The Castle Cliff" or "the Cliff with the Castle." It is situate at the end of a valley, and is built between 100 ft. and 200 ft. above Ordnance Datum, in a recess of a bay midway between Flamborough Head and Whitby, and is one of the terminal stations of the York and Scarborough, Hull and Scarborough, and Scarborough and Whitby branches of the North-Eastern Railway. It is mainly dependent upon its visitors, in the season, for its trade. The fisheries give employment to a number of its population, and there is a patent tiled floor-cloth manufactory in the borough.

The Corporation, he said, have ever been mindful of the fact that in order to keep pace with other health resorts and watering-places on the North-East and South Coasts, it must necessarily follow a progressive policy, and in order to keep Scarborough to the fore and put the town into a thorough sanitary condition and make the place attractive, they have borrowed large sums of money at different periods and expended them on sewerage works and various useful and important public improvements. During the past ten years there have been seven Local Government Inquiries for various works, and the amount sanctioned during that period was 81,400*l.*

The following are some of the main items of capital expenditure, the works for which have been designed and carried out by the author:—Sewerage works, 20,800*l.*; carriage drive and sea-wall on the South Foreshore, 4,500*l.*; works of paving, 20,500*l.*; improving highways, 30,800*l.*; public walks and pleasure-grounds, 6,000*l.*

Sewerage Works.

The town is divided into two drainage areas, with two main outfalls, following the natural valley lines of the district. The outfall on the south side commences near the Aquarium with a circular brick sewer 3 ft. 2 in. diameter, continuing along the Foreshore-road to the West Pier, from this point to its outlet is 4 ft. diameter, passing through the harbour and the outer pier with cast-iron pipes. The gradient varies from 1 in 300 to 1 in 500, and was constructed by my predecessors at different periods from 1863 to 1867. This outfall takes the subsidiary sewers in the Ramsdale Valley, the old part of the town, and the South Cliff, which in their turn receive the sewage of about 16,400 persons. The total length of this outfall is about 1,250 yards. The outfall on the north side of the town commences at High Peasholm and continues along the valley to the beach, where, until 1883, it continued across the sands and discharged at low-water mark. At this period the Corporation were considering a scheme for improving the north undercliff and foreshore, and the question of dealing with this outfall naturally presented itself, as part of the beach

at this point would eventually be required as a bathing-ground. The author was therefore instructed to report upon this outfall. After careful consideration, and taking observations as to the currents in the bay, he recommended that it be continued northward along the base of the cliffs, and discharge below low-water mark into a creek of rocks at Scalbyness Point, a distance of about one mile beyond the borough boundary. This recommendation was accepted and the works carried out under contract.

The new outfall was constructed of two half-brick rims in cement, with invert blocks and wrought-iron straps 6 ft. to 7 ft. apart, and where the crown of the sewer appeared above the level of the beach it was covered with cement concrete. It is 5 ft. internal diameter, and continued through the rocks with cast-iron pipes for a distance of 200 yards; the gradient is 1 in 500. The total cost of this outfall, including 1,850*l.* for the iron pipes, was 6,900*l.* The subsidiary sewers and drains discharging into this outfall are of various dimensions, some are brick sewers 3 ft. diameter and others stoneware pipe sewers varying from 12 in. to 18 in. diameter. All the sewers have good falls, and are carried out in straight lines with manholes and lampholes in the usual way. The population served by these sewers and outfall is about 17,400.

During the past ten years about 3½ miles of brick and pipe sewers have been laid in various parts of the borough. The system of ventilation adopted for the past twenty years is by cast-iron pipes, varying from 4 in. to 6 in. diameter, carried up the gable ends of houses or other high buildings clear of all windows and chimneys; all surface ventilating grids have been abolished. There are about 250 of these vent-pipes on the drains and sewers at the present time, and others are being added every year as the town extends. No difficulty is experienced in obtaining permission from owners to fix these vent-pipes on private property. They are all placed on sufferance, but it is a very rare occurrence that any person requests them to be removed.

Street Works.

Most of the streets in Scarborough are now made up and repaired with tar paving. There are yet some streets, and the main thoroughfares into the town, which are made up and repaired with whinstone. In some cases, tar macadam is substituted for dry macadam. The whinstone is obtained from Inverkiething, Scotland, is hand broken, and costs 10s. 8½d. per ton in the yard when broken and screened.

The system of tar paving for footpaths has been adopted in this town for the past thirty years, and for roadways about twenty-two years, but it was not until 1883 that the Corporation decided to apply to the Local Government Board for sanction to borrow money for tar-paving works. The first application was made in November in that year, and the usual inquiry was held by Mr. Arnold Taylor, C.E., the inspector appointed, and a loan was sanctioned for ten years. Several inquiries have since been held, and at the last inquiry held in 1891, by the late Mr. Thornhill Harrison, M.Inst. C.E., a careful examination of the paving was made by him, and in expressing himself highly satisfied with the system adopted said, "the secret of your success is that no water can get to the foundation." The amount sanctioned to loan up to the present time for tar-paving works is 20,863*l.*, and instructions have been given for another application to be made for all the remaining secondary streets in the borough.

The following is a description of the materials and the process of preparation ready for laying on the roadways. The first coating is composed of local stone, gathered from the beach along the coast, and broken to a 2½-in. gauge, placed in long heaps about 15 in. in thickness, and about 5 ft. in width. Fires are kindled along the top of the macadam, and the whole heap covered with clinkers and cinders, obtained from the gas-works, and allowed to burn from twelve to eighteen hours, according to the state of the weather. The heat strikes down into the macadam and evaporates all moisture. The whole of the materials, including the clinkers and cinders, are turned over in its heated state, and cold tar is incorporated while the material is still warm, and then deposited ready for use. The second coating in composed of screened gravel to a 1¼-in. gauge, and is prepared in a similar manner to the first coat, except that no clinkers are used, and the rough portion of the cinders used in burning are removed and re-used. The finishing coat is a mixture of fine cinders and gravel, the whole to pass through a ⅜-in. mesh riddle. The cinders are laid on the ground about 6 in. thick, and 6 in. of fine gravel on the top. The whole is then covered with the rough cinders as before, and heated in a similar manner to the other materials. After burning about forty-eight hours, the materials are passed through a ⅜-in. riddle to remove the rough cinders used in the heating process. The fine cinders and gravel being then mixed together, they are incorporated with cold tar and thrown up into heaps. The material for footpaths are prepared in the same manner as described for the second and finishing coats for the roadways. The footpath foundations being formed of brick rubbish or sandstone about 4 in. thick, great care being taken that no clay is allowed to come in contact with the materials.

Before laying down the tar paving the roadways are put into proper form and consolidated with a 10-ton steam road roller. The undercoat is then laid on and again rolled with the steam roller. The second coat is treated in a similar manner, and the finishing coat follows on, and a 7-cwt. roller passed once over it; a sprinkling of burnt gravel is then thrown on and rolled in. The rolling is continued until the surface is sufficiently set to admit of being rolled with a 2-ton horse roller 2 ft. 6 in. diameter. The traffic is allowed to pass over the road as soon as the last coat is laid on. This system of tar paving is easily repaired, is dry in a few minutes after a shower of rain, is not slippery except in frosty weather, and street cleansing and watering is reduced to a minimum; it is impervious to moisture, and is practically noiseless.

For a few months after the pavement is laid down, and until it is sufficiently set, complaints are sometimes heard, principally from cabmen, of the heavy drag on vehicles running over it, but as the materials consolidate the surface hardens and the cause of complaint is removed. For the purpose of determining to what extent it was desirable in this borough to substitute tar paving for ordinary macadam the author prepared a return showing the annual cost of maintenance of some of the streets macadamised, and comparing the same with tar paving over the same period of ten years.

The following are some of the typical cases:—

	Tar paving, Annual Cost of Maintenance.		Macadam, Annual Cost of Maintenance.	
St. Nicholas-street	2·5d.	per yd. sup.	8·5d.	per yd. sup.
Huntriss-row	6d.	do.	3d.	do.
Esplanade-gardens ..		Nil.	2·10	do.
Grove-terrace Back-road .	25d.	do.	2·5	do.
Cromwell-terrace	Nil.	do.	3·70	do.

Some roads in the borough have been laid with tar paving for a period of seventeen years, and have not cost more than 2d. per yard super. for repairs during that period. We find this kind of paving to be most suitable for all streets, except main thoroughfares, where the traffic is very heavy. It is greatly appreciated by the residents and the many visitors who from time to time visit our town.

The cost of the paving for roadways, exclusive of any foundation, is 2s. per yard super., and for footpaths 1s. per yard super.

Under the 150th Section of the Public Health Act all private streets are made up with tar paving and kerbed with 12 in. by 6 in. and 12 in. by 4 in. tooled Yorkshire kerb. During the past ten years plans and estimates have been prepared for making up about sixty streets, and in all cases the work has been executed by the Surveyor and his staff, and others are now in hand.

Royal Albert Drive and Sea-Wall.—Those Members of the Association who are also Members of the Institute of Civil Engineers may have read a paper by Mr. Whately Eliot, M.Inst.C.E., who was engaged as resident-engineer on the works which have up to the present been carried out in the North Bay. It is there recorded that "the Corporation instructed their Surveyor to prepare plans for the construction of a sea-wall and road at the base of the cliff."

To show the position of the author in relation to the works carried out, it may briefly be stated as follows:—

In April, 1882, the Corporation resolved to take into consideration the question of dealing with the undercliff, and construct a sea-wall in the North Bay, and instructions were given to prepare plans for a complete scheme, not only dealing with the North Bay, but continuing round the headland to the South Foreshore-road. The scheme proposed was for a sea-wall and marine-drive commencing at Peasholm on the north side, and extending along the North Sands at sufficient distance from the cliff base to form a drive 60 ft. wide, and a promenade 30 ft., to a point known as Coffee-Pot Rock, a distance of 1,600 yards. From this point the wall to be continued round the foreshore seaward of the Castle Cliff, at sufficient distance between the base of the cliff and the inside of the drive to form a receptable for *débris*. Round the headland the drive would be 40 ft. wide, and the promenade 20 ft. wide to its junction with the East Pier, thus forming a connecting link with the South Foreshore-road, a total length of 1 mile 1,320 yards.

This scheme, with sections of the proposed wall, were submitted to the late Sir John Coode for his opinion and report. In June, 1883, the report was received approving this scheme. The following is an extract taken from the Report:—

"There can be no question that the drive and promenade would add considerably to the attractions of Scarborough. The wall from Peasholm to the northern point of the Castle would not be subject to a heavy wave stroke; not so, however, the length from the latter point to the East Pier, which would be very much exposed, more so, in fact, than any other structure erected for a similar purpose with which I am acquainted. There need, however, be no apprehension on this head, as the height of the wall (19 ft. above high water of spring tides), coupled with the effect of its concave face, and the great mass of the work, would be sufficient to ensure its security. There can be no question that Mr. Petch exercised a wise discretion in proposing a concave profile for the wall, as it will throw back the sea more effectually than any other, thus proving a drier road, and at the same time minimise the stroke of the waves against the works."

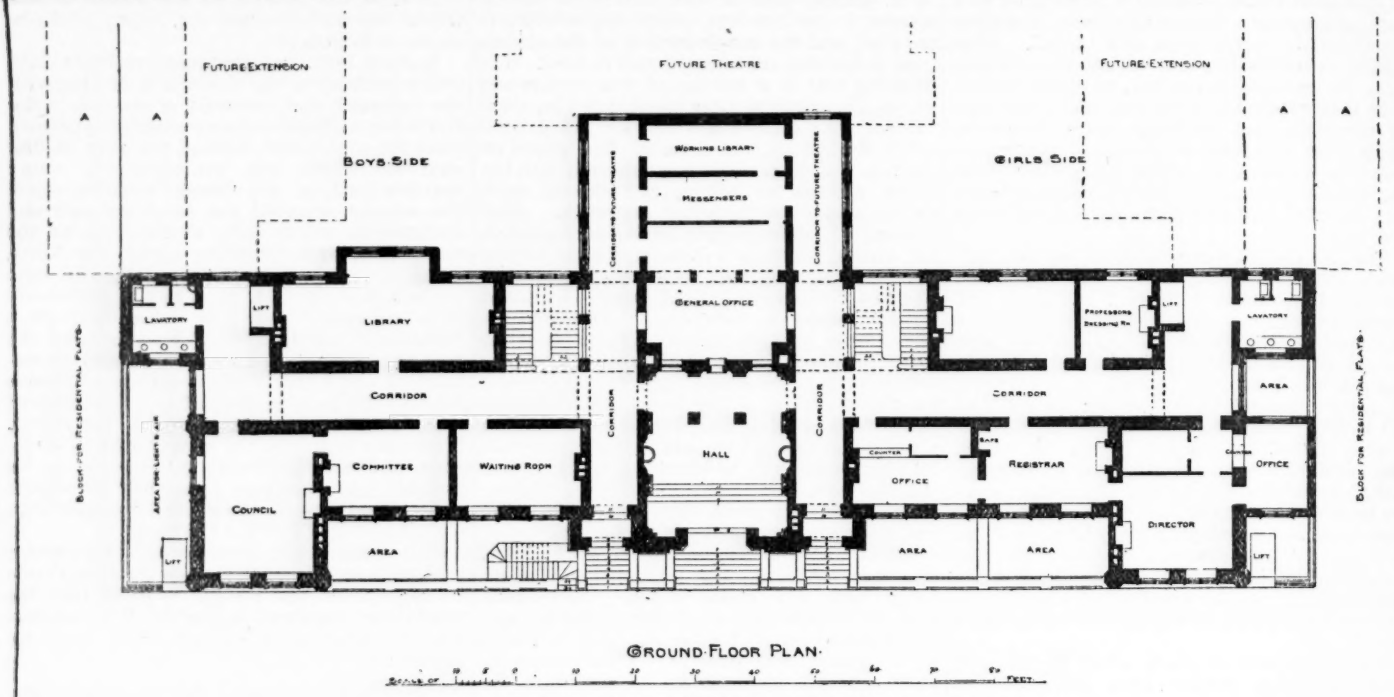
In the autumn of 1885 a large quantity of shingle appeared on the foreshore, and in anticipation of the wall being constructed the author commenced relief works, and collected about 6,300 cubic yards; this material was afterwards found to be of the greatest service in the work, as no shingle of any quantity has since appeared.

The works as carried out are part of the above scheme somewhat modified, the position of the wall being considerably nearer the base of the cliff, and are fully described in the paper referred to, and recorded in minutes of proceedings of the Institute of Civil Engineers, vol. cv., Sessions 1890-91, Part III. Since the work was completed the erosive action of the sea upon the shale at the toe of the wall would, if allowed to continue, have undermined the foundations. Within a period of twelve months it was found in some places to have scooped out to a depth of 3 ft. into the shale. The author has since constructed an apron, which was formed by excavating out the shale to an average depth of 2 ft., forming a toe of concrete, and paving the surface with Yorkshire setts, 9 in. thick, and grouting with cement. The toe of the apron to a depth of 4 ft. below the level of the shale is formed of concrete with a special facing of one part of sharp sand to one of cement 3 in. thick, and was put in with the mass work. The concrete in mass was composed of 5 parts of shingle, 2 of sand, and 1 of cement. The total length of the apron is 800 yards, and is 15 ft. wide, with a fall of 1 in 4½ in., and cost 2,600*l.* It is anticipated that this work will prevent the further scouring away of the beach, and protect the wall for many years to come. It is the intention of the Corporation at some future date to continue the drive round the headland, and in anticipation of this work the necessary Parliamentary plans were prepared, and the scheme was embodied in an Improvement Act which was obtained in 1889. The Parliamentary estimate was 70,000*l.* In the event of these works becoming an accomplished fact, Scarborough would possess a marine drive about 2½ miles in length.

The Clarence Gardens in the undercliff are over 19 acres in extent. A band-stand and shelters have been erected, some of which have ladies' cloak-rooms and lavatories attached.

The total cost of the North Cliff Improvement Works has been 48,639*l.*

[*Continued on next page.*



Royal College of Music, South Kensington.

Illustrations.

DECORATIVE PANEL: "YOUTH, THE TOILERS AND THE IDLERS."

THIS panel, a decorative painting by M. Gustav Natorp, now exhibited in the Architectural Room at the Royal Academy, forms part of the scheme of decoration of the upper portion of a drawing-room wall, above an oak dado 7 ft. 6 in. high. The subject of the whole scheme of decoration is "The Three Ages."

The scheme of colour in the room is that of the oak painted dado and of the red and yellow employed in the panel painting; the flowing lines in the composition are intended to contrast with the vertical and horizontal lines of the dado.

We have printed the lithograph in a red tint, as coming nearer to the general effect of the original drawing than black.

ROYAL COLLEGE OF MUSIC.

THIS building stands on a site 200 ft. square, and at present consists in a great measure of a number of small rooms for the instruction of single or at most two or three pupils at a time. There are a few *ensemble* rooms and a rehearsal room, 42 ft. 3 in. by 24 ft. 6 in., but at present no large concert-room. A Council-room and committee-room, a library, rooms and offices for the Director and Registrar, a kitchen, and dining-rooms for the professors, pupils, and servants, are provided.

It is intended that when complete the building shall comprise a theatre capable of being used, not only for operatic performances, but as a lecture-hall and orchestral concert-room. Provision for this is made in the general plan. Room is also left on the site for future extension by wings running north and south at each end. The public entrance and general offices are in the centre. The entrances and staircases for male and female students are on each side. The organ-rooms are in the towers at each end.

The treatment of the design, rendered difficult at the outset by the multiplicity of small rooms, was still further complicated by the final decision to heat the building with separate fireplaces to each room, and by the new road along the north front being raised 19 ft. above the level of the site, necessitating a basement and sub-basement, and curtailing the apparent height of the building.

The architect is Sir A. W. Blomfield, A.R.A., and the drawing of the elevation is exhibited at the Royal Academy.

NOS. 5 AND 7, CADOGAN-GARDENS.

THIS is a drawing of two of the houses in course of erection on the Cadogan estate, Chelsea, now known as Cadogan Gardens. The internal fittings are principally of painted pine, with wainscot in dining-room and staircase. The materials used in these fronts are of Bracknell bricks, and cut and rubbed brickwork, with Corsham Down stone dressings. The work is being carried out by Mr. H. J. Wright, from the designs of Mr. Fred. G. Knight.

HOUSE AT NORTHWOOD.

THE illustrations show north and south views of a house which has lately been built at Northwood.

The walls are faced with red bricks, and the roofs are tiled. The tower on the north side is "rough-cast."

The whole of the wood-work is painted white, except the doors and shutters, which are bright green.

Mr. R. A. Briggs was the architect, under whose supervision the works were carried out by Messrs. Charles Brown & Sons, of Harefield.

The drawings from which the illustrations are taken are exhibited at the Royal Academy.

MUNICIPAL ENGINEERING AT SCARBOROUGH.

CONTINUING his paper,* Mr. Petch next referred to the

Holbeck Pleasure-grounds.

The "Gardens by the Sea" are situate at the end of a ravine on the south side of the town, close to the beach. In laying out these grounds a considerable quantity of water has been found in the cliff, and some heavy drainage works have been constructed at different periods during the past six years. The infiltration of surface water and atmospheric influences upon the upper strata of the cliff has caused heavy slips to occur at different periods. The method adopted to secure and protect the walks above the undercliff, and prevent the loose *débris* from going into the sea, was to put in 6-in. vertical drains with open socket-joints into the solid strata of clay underlying the loose and disintegrated earth, and filling up the trenches with rubble-stone, after which benching into the solid strata and forming an abutment for a dry rubble screen on the face of the cliff. Where these works have been carried out the face of the cliff has been preserved.

Some of these works are now in progress, and other portions will have to be dealt with before the whole of the undercliff is made secure. The base of the scarf of the cliff is being protected from the encroachments of the sea by a pitch-faced stone wall which is now in course of construction; this wall is to be continued further southward to the boundary of the grounds. These grounds are 2½ acres in extent, and well laid out, and although great expense has been incurred in order to maintain the gardens, and further trouble is anticipated, it is the intention of the Corporation to make these grounds secure and complete the laying out as speedily as possible. These gardens are highly appreciated by the visitors and residents, and have proved to be one of the best improvements carried out for some years. Shelters and urinals are provided similar to those in the Clarence-gardens.

The cost of the works, up to date, has been 5,100*l*.

A number of other improvements of some importance have been executed during the past ten years.

Mr. Petch, in concluding his paper, acknowledged the services rendered by his chief assistant, Mr. George Ball, Graduate Member of the Association, in the preparation of this paper, and who has performed important duties in connexion with the designs and execution of the works described herein.

The following statistics were appended to the paper:—The area of the borough is 2,292 acres, and the Parliamentary and Municipal boundaries are co-extensive.

The following table shows the number of houses and the population in each of the census years from 1861 to 1891 inclusive.

Census year.	Inhabited Houses.	Uninhabited Houses.	Houses.	Population.	Increase of population in each decade.
1861....	3,940	214	4,154	18,337	5,422
1871....	5,161	561	5,722	24,081	5,744
1881....	6,242	576	6,718	30,236	6,155
1891....	7,236	797	8,033	33,777	3,541

It is estimated that in the season the population is about 50,000. A census taken by the Corporation on the night of August 26, 1882, of non-residents in the borough, was 16,462. In 1881 the rateable value was 145,601*l*. In 1891 it was 181,232*l*. The death rate for ten years from 1881 to 1890 are as follows:—1881, 16·34 per 1,000; 1882, 18·22; 1883, 18·84; 1884, 17·31; 1885, 16·67; 1886, 18·40; 1887, 16·64; 1888, 15·66; 1889, 17·40; 1890, 16·40.

The town is built between the low level of 25 ft. and the high level of 200 ft. above ordnance datum. There are about thirty-five miles of public highways in the borough, of which about five miles have been declared main roads, and an arrangement has been made with the North Riding County Council for an annual payment of 1,500*l*. towards the cost of maintenance.

The total rates in Scarborough, including poor rate, school board rate, burial board rates, &c., amounted last year to 5s. 6d. in the £. The general district rate is 3s. 2d. in the £; the

* See previous pages.

same now as it was in 1887 in 1888 and 1889 this rate was 2s. 10d. in the £, and in 1890 3s. in the £.

After some discussion, in the course of which the speakers expressed themselves in highly eulogistic terms regarding the system of road construction and maintenance described in the paper, Mr. William Millhouse, Assoc. M. Inst. C.E., Water Engineer, read a paper on the

Scarborough Water Works.

He said that in the year 1845, when the inhabitants of Scarborough were beginning to tire of waiting their turn for several hours at the public conduit by the Market Cross to draw water, a company was formed for the purpose of providing the town with a plentiful supply of pure water. This was obtained from a spring at Cayton Bay, which had been previously utilised for working a corn-mill. The mill and spring were bought, and the mill-wheel was the first motor used for working the pumps, but for a short time only. Mr. Thomas Wicksteed having been called in, he advised that a Cornish pumping-engine, capable of pumping 400,000 gallons per day be put down, which was accordingly done, and in 1853 another similar engine, capable of pumping 650,000 gallons per day, was added to this station. The engines are still in working order, and held as a reserve in case of need. In 1872, when the growth of the town demanded a further provision for its immediate needs, the old Company sank a well, and put down a pumping plant at Osgodby, situate about a mile inland from Cayton Bay.

In 1878, when the Company proposed to bring water by gravitation from reservoirs to be constructed on Jugger Howe Beck, lying on the moors to the north of Scarborough, the Corporation bought the Water Works from the Company, and immediately proceeded, under the advice of Mr. Filliter, of Leeds, to construct new works at Irton, where a well was sunk and engines erected to pump the water into the new service reservoirs, which were built at the same time on Oliver's Mount.

Cayton Bay.—The water at this station is obtained from an underground reservoir formed by a fault of 120 ft. throw in the Oolite formation, by which the Oxford clay is banked up against the calcareous grit. The clay has been tunnelled through, and the water conducted to a dam from which the engines draw their supply. The yield from this source is about 1,000,000 gallons per day. As the engines are of so old and well-known a type, they call for no special remarks here.

Osgodby.—The water at these works is obtained from a well 10 ft. in diameter, lined with brick, sunk 127 ft. into the calcareous grit, with drifts in three directions driven from the bottom of the well. The yield from this source varies between 580,000 and 865,000 gallons per day. The engine is a Cornish Bull engine, placed directly over the well, and capable of raising 600 gallons per minute, through a 12-in. main, about one mile long, to the Osgodby Hill reservoir. The head in the main is 205 ft., including 10 ft. for friction. Steam is supplied by two Lancashire boilers at 40 lbs. pressure.

Irton Works.—The well at this station is 428 ft. deep, the first 70 ft. being 10 ft. diameter, and lined with cast-iron cylinders firmly bolted together and sunk down into the Kimmeridge clay, where the bottom of the cylinders was closed in with cast-iron plates, and a bore continued for 28 ft., lined with 24-in. tubes of cast iron, until the water was reached. A plug was fitted on the top of the 24-in. tubes to shut down the water.

The bore was sunk for 152 ft. at 20 in. diameter, and for 178 ft. at 12 in. diameter, until the Oxford clay was reached.

Well.

	ft.
10 ft. cylinders	70
24 in. tube	28
20 in. rock	152
12 in. ,,	178
Total	428

Strata.

	ft.	in.
Boulder clay	53	6
Kimmeridge clay	45	0
Upper calc, grit	46	6
Upper and lower limestones	120	6
Lower calc, grit	135	0
Changing to Oxford clay	28	0
Total	428	0

The overflow from the well is about 1,000,000 gallons per day, and the engines have never materially lowered the water when pumping continuously day and night. It has been proved by the author that the river Derwent keeps this strata continually supplied through fissures in the rock in the bed and sides of the river. Having placed a dam across the entrance to one of the largest of these swallow-holes, and stopped the water from going in, all the wells in the neighbourhood were dried up, and the surface of the water in the Irton well was also lowered, but to so small an extent that it was considered the loss of this supply would not seriously affect it. The engines at Irton are a pair of beam engines, double-acting, rotative, and condensing, capable of lifting together, through a 13 in. main about four miles long, 1,000,000 gallons per day, either to the upper or lower reservoirs on Oliver's Mount. The water is raised from the well into the condenser tanks by combined bucket and pluger pumps, and passed through the condenser to the force pumps. The rams of the force pumps are pistons packed with gutta-percha rings in place of the leather packing originally designed. The capacity of the pumps is 29·25 gallons per revolution, and the quantity delivered into the Mount Reservoir. 27·25 gallons, being an efficiency of 93. Air is fed into the air vessels by Wipperman's injectors.

Steam is supplied by two Lancashire boilers with Fox's corrugated flues and Vicar's feeders. Coal is delivered at the works, into bins under cover, by a siding from the North Eastern Railway, thence conveyed in half-ton tramway wagons to the boilers. The head in the main, above the gauge in the engine room, to the lower reservoir, is 240 ft., and when the engines are working this is increased 60 ft. when raising 800 gallons per minute. The engines are 42 i.h.p. each, and the coal burnt averages 3·5 lbs. per i.h.p.

Reservoirs.—The service reservoirs are three in number,

1. A high-level reservoir situate on the top of Oliver's Mount, 505 ft. above Ordnance Datum, capacity 1,500,000 gallons. This reservoir has just been covered with a roof of concrete. The concrete is supported on rolled steel joists, 12 ft. apart, which rest on brick pillars. The concrete is covered with two coats of asphalte, and finally with a covering of broken stone and gravel.

2. A low-level reservoir situate on the west side of Oliver's Mount, 338 ft. above Ordnance Datum, capacity 1½ million gallons. This reservoir is covered, built of brick, and lined with salt-glazed bricks of local manufacture. A bed of puddle is laid under the reservoir and round the sides. The cover is formed of brick arches carried by cast-iron girders resting on brick pillars, which stand on foundations formed by inverted groined arches bedded on lias lime concrete. This reservoir has remained perfectly sound, and is very easily kept clean and in order.

3. An open reservoir at Osgodby Hill, situate about two miles from Scarborough, and 337 ft. above Ordnance Datum. Capacity 4½ million gallons. A new floor has recently been laid in this reservoir, the area being 5,354 sq. yards. The floor was formed of concrete 6 in. thick, made of 4 parts broken brick, 2 parts small gravel and sand, to 1 part of cement, and topped with 1 in. of blue granite chips passed through a riddle of ⅜ in. mesh, and cement 2 to 1. This has formed a solid and smooth floor, capable of standing the thorough sweeping and cleansing that may become necessary.

All the reservoirs are connected, and the mains so arranged that the engines can pump into any reservoir or direct into the town.

Supply.—The total supply of the town is as follows:—

	Gallons.
Cayton Bay per day	1,000,000
Osgodby Well	900,000
Irton Well	1,160,000
Total ...	3,060,000

all of which can be pumped into the reservoirs by the engine power at command.

The largest daily consumption is in August, when it has reached 1,250,000 gallons, the number of inhabitants being about 50,000. After deducting water used for trade and similar purposes, the consumption per head per day equalled 20¼ gallons. . . . .

Distribution.—Trunk mains conduct the water through the chief thoroughfares of the town, and each street branching off, has a main with its own sluice-valve for turning off, and flushing-cock at the end. The flushing is regularly attended to, and is found to give better results than allowing the water to circulate by having the by-mains connected to the trunk-mains at both ends. On account of the hilly nature of the town, the author has introduced pressure reducers on two of the trunk-mains to relieve the strain on the house-fittings. One reducer, a 5-in. is fixed on the 8-in. main from the high-level reservoir, and reduces the pressure from 110 lb. to 60 lb. on the square inch. The other reducer, also a 5-in., is fixed on the 7-in. main that supplies the Sandside district, and reduces the pressure from 80 lb. to 50 lb. on the square inch. Both have answered perfectly, and caused no trouble.

Meters.—The meters in use are Siemens's pattern, made by Guest and Chrimes. With constant attention these meters give fairly-good results, especially where a regular supply passes through them. Every meter is tested before it is sent out, and also immediately it is brought in, and a careful record of the testing is kept. This record has proved most useful, especially in cases of dispute with dissatisfied consumers. Regular inspection for the prevention of waste is carried on daily, with night inspection at short intervals. At night each main is tested alternately by closing and sounding the street valve. Water passing is at once detected, and by sounding the stop taps in the street, the leakage is localised and reported, when the day inspectors complete the search by internal examination in the day-time. A Deacon's meter has lately been fixed so as to control the oldest part of the town, and has proved a very useful instrument for saving water. Leakage from the mains in quantity are at once shown on the diagrams, and the work of the inspectors most effectively controlled. The waste from fittings in this district has already been reduced about 3,000 gallons per hour. This, however, will only be maintained by most constant attention. Rules and regulations have been adopted to ensure the use of good materials and workmanship in relation to water fittings, and all taps are tested and stamped by the Water Department before they are fixed, although the Local Government Board would not sanction a clause in the regulations making this compulsory. We have no trouble in getting the plumbers to send in the taps for examination, as they find it is to their advantage to do so, a large number of taps having to be returned to the makers as defective.

The following clause was inserted in the Scarborough Improvement Act, 1889, on the recommendation of the author: "The Corporation shall not be bound to begin to supply water to any person in respect of any premises, unless and until the water regulations of the Corporation applicable to such premises, shall have been duly complied with."

Main Scraping.—As the author has been obliged to either abandon or clear an 8-in. main, the first one laid by the old company, it may be of interest to give some data concerning the work. The total length of the main to be cleared was 2,240 yards, the diameter of which had become reduced to 5 in. by a hard incrustation, something after the form of coral in structure, and composed of lime, silt, and iron rust, the pipes not having been coated as is at present customary. Scrapers and hatchboxes were obtained, and the latter fixed, one at each end of the main, and one half way between, near to a water-course, to act as a flush-out. All being ready, the scraper was placed in the main, near to the Osgodby Reservoir, and the water turned on, giving a pressure behind the scraper of 30 lbs. to the square inch, which, however, failed to move it.

An engine was then started to pump, and the pressure got up to 59 lbs. on the square inch with a like result. The scraper was taken out and replaced in the main at the Scarborough end. Water was then turned on from the high level reservoir, which gave a pressure of 95 lb. to the square inch. Immediately the scraper started, and got through to the flush-out half way on the main in a few minutes, the pressure falling to 65 lbs. on the square inch during the passage of the scraper. This part of the main must have been fairly clear, but the scraper brought some stones and a large piece of lead along with it. The scraper, having had the leather clacks, &c.

attended to, was put into the main again and the hatchbox cover bolted on. The water was again turned on, but, not having an open end on the main for the water to get clear way, slow progress was made, and finally the scraper stopped at a bad joint. Having cut it out and replaced it, the main was opened out at the end and steady progress was made until the scraping was completed.

The rumbling noise made by the scraper when working, can easily be heard on the surface of the ground by anyone walking above it, and the pace at which it travelled, in our case, was a very fast walk. The amount of silt brought out of the main was astonishing. The scraper has been put through the main again this year, and it is intended that the same shall be done annually, to keep the main in good order.

The cost of the first scraping was:—

	£	s.	d.
Plant, including hatchboxes and fixing same	48	18	2
Scraping main	13	0	4
	£61	18	6

After an interesting discussion, the members visited the stables of the Borough Sanitary Department and other works, expressing themselves well pleased with what they saw, and they were subsequently entertained at luncheon by the Mayor.

THE SURVEYORS' INSTITUTION:

PROFESSIONAL EXAMINATIONS.

THE Secretary of this Institution has issued a circular calling special attention to the fact that, under the revised rules, all applications from candidates for the Professional Associateship or the Fellowship Examinations for 1893 must reach the Secretary before the end of the preceding month of October, instead of the end of the preceding month of November, as under the old rules.

Attention is also called to the fact that the Division V. Examination, which has been suspended for some years past, is now revived in a greatly modified form. Those whose qualifications fall within the conditions of entry for this Examination can, by means of it, qualify directly for the Fellowship of the Institution without passing a previous Examination.

A Direct Fellowship Examination will be held in March next, contemporaneously with the other Professional Examinations.

FELLOWSHIP EXAMINATION.

The following gentlemen having passed the requisite Qualifying Examination, have been transferred by the Council from the Class of Professional Associates to that of Fellows:—

Brackett, F. H., Tunbridge Wells.
Corderoy, A., London.
Davey, H. T., Hastings.
Eagland, W. F., Leeds.
Grogan, H. H., London.
Kemp-Smith, J. F., Orsett.
Martin, T., Redbourn.
Muller, J. J., London.
Richardson, O. A., London.

SPECIAL-CERTIFICATE EXAMINATIONS.

The following members of the Institution have passed the recent Special-Certificate Examination in Sanitary Science:—

Assiter, H. G., London.
Foster, F., London.
Inkpen, G. C., Southsea.
Jones, H. A., London.

ARCHITECTURE AT UNIVERSITY COLLEGE.

THE following awards have been made to students attending Professor T. Roger Smith's classes:—

(*A.*) *Fine Art.*—1st Class Certificates: W. J. Keith (Donaldson Medal), Miss G. M. Dulley (Book Prize). 2nd Class Certificates: Clyde Young, W. C. Brown.

(*B.*) *Construction.*—1st Class Certificates: W. G. Hazell (Donaldson Medal), A. F. Wickstead (Book Prize), H. G. Church, C. L. T. Griffith. 2nd Class Certificates: A. R. Hennel, G. H. Coles, Clyde Young.

Professor's Prize for Sketches.—W. C. Brown.

Carpenters' Company's Prizes.—Architectural Drawing:—Theobald. Constructional Drawing: H. I. C. Kühl and A. Hayward.

CHANGE OF ADDRESS.—Mr. Robert Williams, A.R.I.B.A., has removed from 8, John-street, Adelphi, to 104, Burnt Ash-hill, Lee, S.E.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, Mr. Dickinson, the Deputy-Chairman, presiding in the first instance.

Election of Chairman.—On the motion of Lord Carrington, seconded by Mr. John Burns, Mr. John Hutton, Vice-Chairman, was unanimously elected Chairman, in the room of Lord Rosebery, resigned. Mr. Hutton then took the chair, and thanked the members for electing him.

The Vice-Chairmanship.—On the motion of Dr. Collins, it was resolved that next Tuesday the Council should proceed to the election of a Vice-Chairman in the place of Mr. Hutton.

Tenders.—Tenders (three) were received for the erection of a school building at the Crossness Pumping Station.

Insanitary Areas at Shoreditch and Deptford.—The Council proceeded to the discussion of the adjourned report of the Public Health and Housing Committee, who recommended the approval of schemes for the improvement of insanitary areas in Shoreditch and in Deptford. The estimated cost of the Moira-place and Plumber's-place, Shoreditch, scheme, not including the cost of making up the new roads, was,—gross 60,000*l.*, recoupment 8,700*l.*, leaving a net cost of 51,300*l.* It was estimated that 550 persons of the artisan class would be replaced, and 400 rehoused. The Committee recommended approval of the scheme, and the authorisation of the Council's officers to attend the local inquiry to be held in support of the scheme.

Mr, Bruce moved and Mr. Catmur seconded as an amendment,—

"That the recommendation be referred back to the Committee, with instructions to amend the plan of the scheme by omitting from it that part which involves the acquisition of the houses facing Nile-street."

A long discussion ensued, the result of which was that the amendment was lost and the recommendation approved.

Mr. Beachcroft then submitted the report as to the Mill-lane area, Deptford, with reference to which the Council were asked to pass the following:—

"That it appears to the Council that the closeness, narrowness, bad arrangement, and bad condition of the buildings situate upon a certain area known as the Mill-lane area (comprising houses in Mill-lane, Lambert's-buildings, Morss-buildings, Knott's-buildings, and Poplar-row) in the parish of St. Paul, Deptford, in the County of London, delineated and coloured red on the plan now before the Council, marked A, and the want of light, air, ventilation, and proper conveniences and other sanitary defects in the said buildings, are dangerous or prejudicial to the health of the inhabitants of the said buildings and of the neighbouring buildings, and that the demolition, reconstruction, and rearrangement of the said buildings is necessary to remedy the said evils, and that the area comprising those buildings and the yards, outhouses, and appurtenances thereof, and the site thereof, is too small to be dealt with as an unhealthy area under Part I. of the Housing of the Working Classes Act, 1890, and the Council doth by this resolution direct a scheme to be prepared under Part II. of the said Act for the improvement of the said area."

After some discussion, and the rejection of an amendment to refer the matter back to the Committee, the recommendation of the Committee was carried.

Fire Brigade Station, East Dulwich.—The report of the Fire Brigade Committee contained the following paragraph:—

"The Council on May 24 last resolved to accept a tender of Messrs. Stimpson & Co., amounting to 10,260*l.*, to erect a fire-engine station at East Dulwich, provided that that firm agreed to the insertion in the contract of the condition that they would pay the London rate of wages, and observe such hours of labour as were generally accepted in London, as fair in the trades they employ, and the Council instructed the Solicitor to prepare a contract with the firm. On the Solicitor informing Messrs. Stimpson & Co. that the contract was ready for their signature, they wrote a letter, dated June 20, pointing out that since their tender was submitted (May 3), the rate of pay of all workmen, skilled and unskilled, had been increased by a halfpenny an hour, and that as their tender was based on the old rate of pay, the new scale which under the Council's resolution they would have to pay would add materially to the cost of labour. They therefore asked that they might receive an amount in excess of the sum named in their tender to cover the increased expenditure to which they would be put for wages. They have since named 350*l.* as the figure to be added to the sum quoted in their tender. The Council will remember that, after considerable difficulty had been experienced in finding a site, tenders for the erection of the station were opened at the meeting of the Council on February 16 last, the tenders being as follows:—

Messrs.	G. Munday & Son ...	£10,480
,,	Scharien & Co.	11,427
,,	Stimpson & Co.... ...	11,540
,,	J. Garrett & Son ...	14,080

These tenders were referred to us, and after careful consideration we came to the conclusion that it would not be well for the Council to accept any of them, but that the specification of work should be revised, and that fresh tenders should be invited by public advertisement. This course met with the Council's approval; fresh tenders were accordingly obtained, which, on being opened at the meeting of the Council on May 3, were found to be as follows:—

Messrs.	Stimpson & Co.	£10,260
,,	G. Munday & Son ...	10,716
Mr.	H. L. Holloway	10,864
Messrs.	Holliday & Greenwood...	10,877

As stated above, the Council conditionally accepted the tender of the first-named firm. The Architect informs us that he is satisfied, from inquiries which he has made, that Messrs. Stimpson & Co. did not, in making their second tender, take into account any possible future rise in the rate of wages, and it appears to us, under all the circumstances, that it would be advisable to comply with Messrs. Stimpson & Company's request, and add to the amount named in their tender the sum for which they ask, and which the architect reports to be reasonable. It will be observed that if Messrs. Stimpson's tender be increased by 350*l.* it will then be 106*l.* below the tender of Messrs. Munday & Son, who would probably also ask for an increased sum if the work were entrusted to them. The only alternative open to the Council would be to again invite fresh tenders, a course which past experience would seem to show would not be advantageous to the Council. One result of such a course would be this—that as the contract could not be entered into before October, the foundation work of the building would have to be executed during the winter months. Messrs. Stimpson & Co. have built several fire stations, including the one recently opened at Wandsworth; their work is well spoken of by the Architect, and if the contract be now let to them, substantial progress could be made with the building before the winter begins. We therefore recommend—

'That, subject to a supplementary estimate being submitted to the Council by the Finance Committee as required by the statute, the sum of 350*l.* be added to the amount of 10,260*l.* for which Messrs. Stimpson & Co. undertook to build the East Dulwich station, and that the solicitor be instructed to at once obtain Messrs. Stimpson & Co.'s signature to the contract.'"

This was agreed to.

Compulsory Purchase of Land.—The same Committee recommended that the Parliamentary Committee should be instructed to insert in a Bill, to be promoted by the Council in the next Session of Parliament, a clause authorising the Council to acquire compulsory property required for Fire Brigade purposes.

Mr. Henderson moved to strike out "Fire Brigade" and insert "public" in the recommendation. Mr. S. Webb seconded the amendment.

After a long discussion, the amendment was carried by 32 to 31. On a division being taken, there voted for the amendment 50, and 47 against.

Mr. Westacott moved to refer the question to the General Purposes Committee for consideration and report.

The Hon. R. Grosvenor seconded.

The Council again divided, when there voted:—For the amendment, 48; against 45.

The recommendation, as altered by Mr. Henderson's amendment was then agreed to.

Condition of the River Thames.—The Report of the Main Drainage Committee contained the following paragraph:—

"At the beginning of last month a letter was received from the Secretary of State, transmitting an extract from a report of the Medical Officer of Health of the Port of London on the condition of the river Thames. The extract was to the effect that the river water, in consequence of a few hot days, had already begun to smell badly in the neighbourhood of the outfalls. This letter was referred to the Chief Engineer and Chemist, who have now presented a report, after sufficient time has elapsed to enable them to judge of the effect produced on the river by the new precipitation works at Crossness, which have been in operation since the second week in June. They report that over 30,000 tons of sludge per week is now being carried to sea from the two outfalls, and that the river is free from smell arising from sewage, and from the black patches of discoloured water, which formerly were so offensive; they also state that even at low tide no black mud is stirred up in the wake of steamers passing up and down the river. These results, obtained in so short a time, appear to us to be very satisfactory, and we have directed that a copy of the report be sent to the Secretary of State."

The Safety of Railway Stations. — On a motion of Alderman Beachcroft, the following resolution was adopted:—

"That it be referred to the Building Act Committee to consider and report on the expediency and practicability of obtaining such an amendment of the Metropolitan Building Acts as to bring the railway stations in London and other structures exempted within the provisions of those Acts and of the Metropolis Management Acts."

After discussing other business, the Council adjourned.

Correspondence.

To the Editor of THE BUILDER.

THE EXAMINATION IN ARCHITECTURE.

SIR,—The term, "Examination in Architecture" is, no doubt, very comprehensive; but is it not, in fact, a very deceptive misnomer? The test is doubtless most admirable of what the knowledge of an average architect or clerk of works should have, but where? where? is the "architecture" so boldly advertised? The worthy Chairman of the Board of Examiners told the Institute on Monday night that 60 per cent. of the candidates were relegated in some way for design; for this we are profoundly thankful; but what of the others, who perspire and wrestle with the design on the one brief day in the Examination-week, followed by the crotchets of a long *vivâ-voce?* I speak for some, if not many, who would gladly have given three or four days to be properly exercised in those powers of design which their years of study must have evolved.

Let the Council of the Institute, therefore, give this as an instruction to the Board of Examiners, and thus make a real "Examination in Architecture." WILLIAM A. PITE.

5, *Bloomsbury-square*, July 12.

DEVONSHIRE ARCHITECTURE.

SIR,—I shall feel obliged if you or any of your readers would inform me of any specimens of architecture worth visiting within easy access of Tiverton, Devon. T. F. GREEN.

July 7, 1892.

*** The neighbourhood is not very rife in objects of architectural interest. We can recommend our correspondent's attention to Ottery St. Mary; perhaps some other correspondent may give him some further suggestions. Tiverton itself has a fine church.

The Students' Column.

CONCRETE.—III.

III.—HYDRAULIC LIMES (*continued*).

CALCINATION.—When limestone containing clay is burnt, the moisture and carbonic-acid gas are expelled at a comparatively low temperature, and the clay is split up into its component parts, silica and alumina; the silica is present in the form of hydrated silicic acid ($SiHo_4$), and combines, as far as possible, with the lime to form calcium silicate. Silica frequently occurs in limestones, in the form of sand (quartz and flint), but is then quite insoluble and cannot combine with the lime. Silica in that form ($Si\ O_2$) is therefore useless, and analyses ought to say in what form the silica occurs.

Analyses.—There is, of course, a great difference in the composition of hydraulic limes, and it is scarcely possible to classify them according to their hydraulicity. We have compiled the following short table, in order that the composition of a few well-known limes might be seen at a glance and compared with one another and with other limes which may at any time be submitted to the architect:—

Grinding.—Many hydraulic limes can only be obtained in lumps as drawn from the kilns; others, however, can be had either in lumps or ground. The lump lime is used chiefly for mortar, as this is, as a rule, ground in a mortar-mill, but the ground lime is preferable for concrete, as a mortar-mill is not usually employed in preparing this material, and some of the lumps of lime are hard enough to resist for a long time, or even altogether, the influence of water, but when finely ground become an energetic part of the lime. It is very seldom, indeed, that any particular degree of fineness is specified by architects or guaranteed by manufacturers. The Aberthaw lime is ground, so that not more than 15 per cent. remains on a No. 30 sieve, that is, a sieve with 900 meshes to the square inch. When we compare this with the fineness of Portland cement, which often leaves less than 10 per cent. on a sieve with 2,500 meshes to the square inch, we cannot fail to notice the great difference between the two, but, of course, there is a great difference in the cost as well. Fineness of grinding is important, for, other things being equal, the more finely ground the lime is, the more sand will it bind together; but half-a-loaf is better than no bread, and any grinding better than none.

Weight. — The weight of hydraulic limes varies considerably, some when ground being only a little heavier than powdered white chalk lime, and others being only a little lighter than Portland cement. The extreme limits of weight may be considered to be 60 lbs. and 100 lbs. per striked bushel (about 1·28 cub. ft.), but the weight varies not only according to the composition and degree of calcination of the lime, but also according to the fineness, freshness, &c. The mode of filling the measure also makes a great difference. Lumps of flatkin mountain lime, weigh about 140 lbs. per bushel; the slaked lime obtained from these, weighs only 64 lbs. per bushel.

Slaking.—In all hydraulic limes there is an amount of quicklime (CaO), which has escaped combination with silica and alumina; this amount is very large in the most feebly hydraulic, very small in the most eminently hydraulic. When water is added to the lime, the oxide of lime present in it is converted into hydrate, as already described in the chapter on rich lime, but the action is less violent and slower in proportion to the quantity of silica and other ingredients which the lime contains. Instead of falling to a powder in a few minutes, as is the case with pure lime, lumps of hydraulic limes may not slake in less than one or two days, and some of the best may take a week; there is little or no vapour evolved, and the increase of bulk is, in the best kinds, comparatively small. But in all hydraulic limes there is a certain amount of slaking action, and this involves a corresponding increase of bulk. When a limestone produces by calcination a substance which, while possessing hydraulic properties, exhibits no slaking action at all, that substance is known as a natural cement.

It is important that the slaking should be thoroughly effected before the lime is made into mortar, otherwise there will be a danger of the cohesion of the latter being destroyed or impaired by the increase in bulk consequent on the gradual hydration of the quicklime in it after the setting has commenced. We have already said that an excess of clay is detrimental; such a lime, when completely calcined, may set rapidly, but pats of it placed in water will soon exhibit cracks, steadily increasing, or will gradually soften throughout. Sometimes hydraulic lime is kept in a shed for a week or more after being slaked, and the hard lumps which have resisted the action of the water are removed before the lime is mixed with sand in the mortar-mill.

There are two or three ways of slaking hydraulic lime-lumps, but the most common method is the one known as "drowning." A basin of sand, which may with advantage be coated with lime-paste to render it more impervious, is formed, and the lumps of lime are spread in it to the depth of 6 in. or 8 in. A quantity of water, varying in inverse proportion to the hydraulicity of the lime, is then added. The Halkin Mountain lime requires about 45 gallons of water per ton, and becomes, when slaked, three times the bulk of the lump lime. The Barnstone Blue Lias lime requires about 40 gallons of water per ton. Excess of water reduces the lime to a paste instead of a powder, and is injurious. After the water has been added, the heap is covered with sand or ashes, or with a tarpaulin, in order that the heat may be retained in the mass. This last precaution is important, because hot water is more active than cold in slaking lime, and steam is still more active; the vapour evolved during slaking greatly assists in slaking the harder lumps. The heap should not be disturbed for one or more days,—not, in fact, until the lumps have been as far as possible reduced to a fine powder. This is the object of slaking, for coarse particles, which are frequently the hard, well-burnt part of the lime, may gradually slake after being made into mortar, and so destroy the mortar; while, on the other hand, they may prove, if reduced to powder, the very best part of the lime. The more hydraulic the lime is, however, the more difficult it becomes to pulverise it by slaking; mechanical means must, therefore, be resorted to. The pulverisation may be effected by the manufacturer, in which case the lumps are ground dry, and the lime is sold as "ground lime;" or, it may be effected on the building-site by grinding the slaked lime in a mortar-mill. This may be done for three or four minutes dry, then the sand may be added, and in about two or three minutes more the necessary amount of water may be poured into the pan, and the grinding continued for about a quarter of an hour. Sometimes the lime-lumps are ground dry in a mortar-mill. In windy places dry grinding is a wasteful operation. It is advisable to mix even lime ground by the manufacturer in a mortar-mill, as the manufacturers frequently do not grind the lime sufficiently fine. When a mortar-mill is not available, the lumps should be screened from the slaked lime, and thrown away. Gilmore says that fresh water should be used for slaking lime, as sea-water in all cases causes less increase of bulk.

Setting.—The chemistry of setting will be considered hereafter. It will be sufficient to state now that setting and hardening are due mainly to crystallisation, brought about by the action of water on the silicate of lime, and not as in the case of fat limes, by mere absorption of carbonic-acid gas from the atmosphere.

Testing.—The test for tensile strength, which is so important a test of neat Portland cement, cannot fairly be applied to neat hydraulic lime, as its cohesive strength is very small. When lime is tested, therefore, the briquettes contain usually three or more parts of sand. The adhesive strength of hydraulic lime is sometimes tested by uniting two bricks or stones with mortar and ascertaining the force required to pull them apart at a certain age. The resistance of various hydraulic limes to crushing has been occasionally ascertained.

A great many experiments have been made by different persons on the strength of Portland cement, but not many have been made with the various hydraulic limes. One reason, doubtless, is the great difference which exists between different limes and the consequent impossibility of formulating a series of standard tests which shall be applicable in all instances. Hydraulic limes are therefore usually selected empirically, and not from knowledge based on any scientific tests. They take, as a rule, much longer time to harden, and attain less ultimate strength, than Portland cement; the testing of them is therefore more tedious, and, adds Mr. Grant, years would be required to get sufficient tests to form an accurate opinion of their merits.

Tensile Strength. — In an appendix to a paper read by Mr. Grant before the Institution of Civil Engineers, in 1880, he gave the results of experiments made to ascertain the tensile and compressive strengths of various limes and cements, mixed with different proportions of sand. The tests for tensile strength were made on briquettes

TABLE I.—ANALYSES OF HYDRAULIC LIMES.

—	Lime.	Silica.	Alumina.	Oxide of Iron.	Magnesia.	Water, Carbonic Acid, &c.	Authority.
Aberthaw *Blue Lias*	78·45	9·35	6·25	trace	—	5·70	H. Faija, 1885.
Barnstone " "	59·61	20·61	6·98	4·01	2·25	6·54	J. B. Dyer, F.C.S.
Warmsworth Cliff (Yorks) *Magnesian*	58·4	0·5*b*	—	1·4	38·6	1·1	F. Hudson.
Teil (France)*	61·83	14·78*a* 6·20*b*	1·61	0·99	1·15	13·73	F. Bömches.

* This is a well-known French lime, much used in different parts of Europe for works in the sea, &c.
a. Soluble silica. *b*. Insoluble silica.

having an area at the neck of 2¼ square inches (1½ in. by 1½ in.); the sand used in gauging the briquettes weighed 96 lbs. per bushel. Five briquettes were kept in air and five in water, and all were tested twelve months after gauging. The following table of tensile strength in lbs. per square inch has been prepared from that of Mr. Grant*:—

TABLE II.—TENSILE STRENGTH (in lbs. per sq. in.) OF LIMES AND CEMENTS.

No.	Limes and Cements.	Weight per bushel.	—	Proportion of lime or cement and sand by volume. Neat.	1—1	1—2	1—3	1—4	1—5	1—6	1—8	1—10	1—12
		lbs.		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	Grey lime	—	Wet	—	—	—	68	57	45	28	—	—	—
		—	Dry	—	—	—	50	44	30	21	—	—	—
2	,, ,, Selenitic	—	Wet	—	—	—	141	140	87	65	—	—	—
		—	Dry	—	—	—	128	65	55	40	—	—	—
3	Lias lime	—	Wet	—	—	—	96	60	47	27	—	—	—
		—	Dry	—	—	—	48	49	32	23	—	—	—
4	,, ,, Selenitic	—	Wet	—	—	—	132	99	72	80	—	—	—
		—	Dry	—	—	—	79	63	44	52	—	—	—
5	Lias lime	—	Wet	—	—	—	81	61	44	34	—	—	—
		—	Dry	—	—	—	40	28	21	18	—	—	—
6	Selenitic lime	—	Wet	—	—	—	148	129	84	74	—	—	—
		—	Dry	—	—	—	124	80	72	58	—	—	—
7	,, Rugby lias	—	Wet	—	—	—	151	102	77	66	—	—	—
		—	Dry	—	—	—	92	59	33	29	—	—	—
8	,, Aberthaw lime	—	Wet	—	—	—	204	147	123	76	—	—	—
		—	Dry	—	—	—	128	84	72	—	—	—	—
9	Rugby lias cement	74	Wet	—	—	—	142	110	75	46	—	—	—
			Dry	—	—	—	78	63	40	20	—	—	—
10	Portland cement	114	Wet	467	334	259	216	171	143	124	102	61	57
			Dry	471	339	238	198	164	144	113	53	45	32
11	,, ,,	120	Wet	649	406	245	195	140	124	100	63	56	43
			Dry	552	357	213	180	161	131	99	70	52	41

One point will be at once noticed on examining the table, and that is the increased strength attained by all the lime briquettes which have been kept in water. The Portland cements gauged with six or more volumes of sand are also, with one exception, stronger after immersion in water than after hardening in the air, but the two cements, when gauged with less than six volumes of sand, give different results. The following table gives the average increase and decrease per cent. in the strength of the various briquettes caused by being kept in water instead of air. For the sake of uniformity, the averages are all calculated on the four series of briquettes gauged in the same proportions, namely, 1 to 3, 1 to 4, 1 to 5, and 1 to 6, the remaining figures in Nos. 10 and 11 not being considered.

TABLE III.

No.	Limes and Cements.	Difference in strength caused by keeping in water instead of air.
1	Grey lime	36 per cent. increase.
2	,, ,, Selenitic	50 ,, ,,
3	Lias lime	51 ,, ,,
4	,, ,, Selenitic	61 ,, ,,
5	Lias lime	105 ,, ,,
6	Selenitic lime	30 ,, ,,
7	,, Rugby Lias	86 ,, ,,
8	,, Aberthaw lime	67 ,, ,,
9	Rugby Lias cement	85 ,, ,,
10	Portland cement	5·6 ,, ,,
11	,, ,,	2·1 ,, decrease.

Compressive Strength.—A table showing the compressive strength of concrete made with the same limes and cements will be given hereafter.

Adhesive Strength.—According to a circular issued some years ago by the Selenitic Cement Company, the force required to tear apart bricks bedded in mortar was, at the end of twenty-eight days, as follows:—

TABLE IV.

Adhesive strength of limes and cements.

White Chalk lime and sand	(1 to 3)	4⅜ lbs. p. sq.in.
Barrow Lias ,, ,,	,,	9 ,, ,,
,, ,, ,, ,,	(1 to 4)	6⅜ ,, ,,
Portland cement ,,	(1 to 4)	23 ,, ,,
,, ,, ,, ,,	(1 to 6)	15½ ,, ,,

Halkin mountain lime made into mortar with one part of sand and one of ashes, has been found to have an adhesive strength of 28·7 to 34 lbs. per sq. in. at 168 days, tested with bricks as above.

* Proceedings Inst. C.E., vol. lxii. (1879-80), part iv.

GENERAL BUILDING NEWS.

ASHTON INDUSTRIAL HOME.—This building, of which Mr. James Crombie, A.R.I.B.A., Brixton, S.W., is the architect (selected in competition), will be carried out by him in conjunction with Mr. E. J. Andrew, of Preston; the works are to be commenced immediately.

WESLEYAN CHAPEL, CHURCH FENTON, YORKSHIRE.—On the 5th inst. the foundation-stones of a new Wesleyan Chapel were laid at Church Fenton, near Leeds. The building, which is to be constructed from the plans of Mr. F. W. Dixon, architect, Oldham, is to cost about 1,150*l.* It comprises a chapel, with sitting accommodation for 200 persons, and a schoolroom for 140 scholars. By an arrangement of sash-windows which separate the two rooms they can, when requisite, be made into one. In addition, there will be two class-rooms, a minister's vestry, and the usual conveniences. The structure is to be faced with wall-stones, and the woodwork will be varnished pitch pine. The contractors are—Masons' work, Messrs. Thompson & Son, Leeds; joiners' work, Messrs. Atkinson & Sons, Leeds; slater, Mr. Dawber, Hull; plumbing, &c., Mr. Snowden, Ossett; and plastering, Mr. William Lonsdale, Malton.

PROPOSED ALTERATION OF THE LUTON PLAIT HALL, BEDFORDSHIRE.—On the 6th inst. a Local Government Board inquiry into the application by the Corporation of Luton for power to borrow money to carry out the alterations proposed to be made upon the Waller-street Plait Hall was held in the Council Chamber at the Town Hall by Major-General C. Phipps Carey. To cover the expense of converting the hall 3,700*l.* is to be borrowed, and 550*l.* additional for covering in the yard adjoining with the iron roof to be removed from the building itself. Councillor Hucklesby gave a short sketch of the history of the building, showing it was no longer required for a straw-plait market, and that there was no possibility of its being again required for that purpose. Mr. Cox, of Messrs. Cox & Marmon, of Liverpool, whose plans have been accepted, and Mr. Roscoe, the Borough Surveyor, then submitted plans and drawings showing what it is proposed to do. It was stated that the tender for executing the work amounted to 3,150*l.*, Mr. G. Smart being the contractor.—The question of roofing the highway depôt was next gone into. The Commissioner afterwards visited the premises along with the members of the Corporation.

PARISH CHURCH, EARLSTON, BERWICK.—The new parish church of Earlston, the foundation-stone of which was laid in April last year, was opened on the 6th inst. The church, built from plans by Messrs. Hardy & Wight, architects, Edinburgh, contains sittings for about 700 people. The building has been erected at a cost of about 3,000*l.*, and occupies the site of the previous parish church.

NEW BRIDGE ACROSS THE DON.—On the 9th inst. Lord Provost Stewart, of Aberdeen, opened a granite bridge which has been erected across the Don at Persley, a point half-way between the villages of Buxburn and Woodside. The bridge is of five spans, the three centre ones measuring 50 ft., and those which rest on the bank at each side 25 ft.; the width is 32 ft., and the approaches 20 ft. Mr. P. M. Barnett, C.E., was the designer of the structure, the contractor being Mr. James Leith, Aberdeen.

FREE CHURCH, MOFFAT, DUMFRIES.—The new Free Church at Moffat, the foundation stone of which was laid in August, 1890, was opened on the 6th inst. The church, which has been erected from plans prepared by Mr. D. B. Burnie, architect, Edinburgh, is in the Early English style, and is built of whinstone from the quarry near Moffat Well, with red freestone facings from Corncockle Quarry. It is situated in the High-street, the spire being 123 ft. in height. The church is seated for 700, the total estimated cost being 4,200*l.*

FREE LIBRARY, ABERDEEN.—On the 5th inst. the new public library at Aberdeen was opened. The building is situated on the new Rosemount Viaduct, and has three principal rooms,—the lending library, the reference library, and a public reading-room. The architect was Mr. Alexander Brown, Aberdeen, his design having been selected in competition. The buildings have cost about 10,000*l.*

ENLARGEMENT OF HOSPITAL, LEAMINGTON.—On the 9th inst., the Right Hon. Arthur Wellesley Peel, M.P., Speaker of the House of Commons, opened a new wing of the Warneford, Leamington, and South Warwickshire Hospital and Bathing Institution, which has been added to the main building at a cost of 14,000*l.* The extension provides accommodation for another thirty in-patients, and comprises two large wards, two small isolation wards, several apartments for nurses, as well as store-rooms, larder, kitchen, and an operation-room. A fresh set of heating apparatus has been introduced into the main block, and is designed to serve for the whole building. Special attention, it is stated, has also been given to the sanitary arrangements. The architect was Mr. Keith D. Young, of London, and the builder was Mr. J. S. Kimberley, of Banbury.

NEW CHURCH, UPTON CROSS, ESSEX.—Lady Cowper on the 30th ult. laid the foundation stone of the new permanent Church of St. Peter, Upton Cross. The new church, which has been designed by Sir A. Blomfield, will take the place of the present iron church, and it will seat about 900. The contract for the building is 6,300*l.*

NEW INFIRMARY, LEWISHAM.—The foundation-stone of the new Lewisham Infirmary, adjoining the Lewisham Union Workhouse, was laid on the 2nd inst. by the Bishop of Lichfield. The infirmary will be built with grey stock bricks, with red facings and some Portland stone in front, and will be divided into four blocks, two being allotted to the patients, male and female, the other two being respectively reserved for the administration and staff quarters. All the blocks will be connected by a corridor running down the centre, and they will each be two stories high, except the administration block, which will be only one story. The centre of the building will be marked by a dome, and the length of the frontage will be about 300 ft. The infirmary is being built at a cost of 51,000*l.*, exclusive of engineering fittings, furnishing, &c., by Messrs. W. Johnson & Co., builders, of Wandsworth-common, to the designs of Messrs. A. & C. Harston, of Leadenhall-street, and is intended for the accommodation of 372 poor sick patients.

NEW CHURCH, HITHER GREEN, KENT.—On the 2nd inst., the Countess of Dartmouth laid the foundation-stone of the permanent church of St. Swithun, Hither Green, Kent, the second of the three churches comprised in the scheme of the Lewisham Church Extension Association. The new church, which is being erected from the designs of Mr. Ernest Newton, of Bloomsbury, by Mr. S. C. Parmenter, of Braintree, will be in the fourteenth century style faced with red brick and with Bath stone dressing. It is to seat 600 persons. The present contract is rather under 5,000*l.*, it being decided not to go further at first than with the erection of the nave and north and south aisles and the west gallery, leaving the chancel and chancel-aisles to be the subject of a future contract. The church will have an open timbered roof covered with green slates, the windows will be filled with plain glass, while over the chancel arch it is intended to place a bell turret covered with lead. When the whole scheme is carried through the total length from east to west will be 120 ft.; at present the dimensions are to be as follows:—Nave, 66 ft. long by 30 ft. wide; north aisle, 66 ft. by 12 ft. 3 in.; south aisle, 66 ft. by 19 ft.; extreme exterior height to the apex of the gable, 58 ft.

SANITARY AND ENGINEERING NEWS.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—The annual meeting of this Association is to be held in Bury, Lancashire, on Thursday, Friday, and Saturday next, July 21, 22, and 23. The new President is Mr. J. Cartwright, Mem.Inst.C.E., F.S.I., Borough Engineer of Bury. The members will assemble on Thursday, the 21st, in the Town-hall, kindly lent for the occasion by the Earl of Derby, K.G., where they will be received by the Mayor (Mr. Councillor Ashworth). After the consideration of the annual report and the presentation of premiums, Mr. W. G. Scoones will move:—"That in view of the fact that the Association now numbers over 500 members, the number of elected members on the Council ought to be increased from 12 to 18, and this general meeting begs respectfully to request the Council to take such steps as may be necessary to have the Articles of Association amended in order to carry out this Resolution." Mr. Cartwright will subsequently deliver his Presidential Address. After luncheon, the following papers will be read and discussed, viz.:—(1) "Factory and Workshops Act, 1891," by Mr. H. P. Boulnois, Mem.Inst.C.E., City Engineer, Liverpool. (2) "Electric Traction," by Mr. J. H. Cox,

Mem. Inst. C.E., Borough Engineer, Bradford. The members will then proceed in brakes, provided by the Corporation of Bury, to visit Fleet-street and Market-street, to see examples of wood pavement in construction; Irwell Forge (by kind permission of Messrs. Webb); Lowercroft Bleach Works (by permission of Mr. Henry Whitehead); the Whitehead Recreation Ground; and the Railway Siding in course of construction connecting the Corporation Gas Works with the Main Line of the L. & Y. Railway Company. In the evening the annual dinner will be held in the Town-hall. On Friday, the 22nd inst., there will be a meeting at 10.30 a.m. for the reading and discussion of the following papers at the Town-hall:—(1) "Sewage and its Purification," by Mr. C. A. Burghardt, Ph.D., &c., Lecturer and Examiner of Owens' College, Victoria University. (2) "Rivers Pollution and Rivers Purification," by Mr. H. A. Roechling, C.E. (3) "Utilisation of Water Power," by Mr. H. G. Coales, C.E. (4) "The Ordnance Survey" (with diagrams), by Mr. H. T. Crook, C.E. At 1 p.m. the party will lunch with the Corporation of Bury under the presidency of Ald. C. Brierley, Deputy-Mayor. In the afternoon there will be visits, under guidance of special leaders, to the following places of interest:—1. Messrs. Wrigleys' Paper Works. 2. The Felt Hat Manufactory of Messrs. Lucas. 3. The Corporation Store-yard, Stables, Workshops, Destructor, and Exhibits. 4. The Peel Mills. Possibly, also arrangements will be made to visit the engineering works of Messrs. Mather & Platt, Salford, electricians, engineers, and machinists, and Messrs. Musgrave, Bolton, engineers, millwrights, and boiler makers. In the evening the members are invited by Alderman John Parks to attend a garden party. On the last day of the meeting, Saturday, July 23, the party will visit Bacup, where members will be conducted in brakes provided by the Corporation of Bury to Sir Thomas Brooks', Baronet, extensive Millstone Grit Quarries for the production of setts, flags, kerbs, &c., when Mr. H. Bolton, Assistant Keeper in Geology at the Owens College Museum, Manchester, and author of the "Geology of Rossendale," has promised to give a short address on the Geological features of the district. The members will afterwards proceed to "Clough Bottom" reservoir in course of construction (viâ Bacup), and will lunch with the Corporation of Bury at White Lee House, "Clough Bottom" reservoir, under the presidency of Councillor Bentley, Chairman of the Water Works Committee. After luncheon they will inspect the works in progress, with description by the engineer (the President), and a Geological Sketch by Mr. H. Bolton, and will then return to Manchester.

IMPROVEMENTS AT TORQUAY, DEVON. — At the Torquay Town-hall on Wednesday last, Mr. Arnold Taylor, Local Government Board Inspector, held an inquiry in reference to the proposal of the Local Board to borrow the sum of 4,200*l.* for street improvements, public walks, and pleasure grounds, and for a promenade and raised terrace walk along the sea front; 2,452*l.* for works of sewerage, and 500*l.* for providing public conveniences. There was no opposition, and after the plans had been explained by the Engineer and Surveyor (Mr. H. A. Garrett, Assoc. M. Inst. C.E.) the Inspector visited the various sites of the proposed works and subsequently intimated that he would in due course make his report to the Local Goverment Board.

THE SANITARY INSTITUTE'S EXAMINATIONS.—At an Examination held by this Institute at Cardiff on Friday and Saturday, July 8 and 9, seven candidates presented themselves as Local Surveyors and thirty-three as Inspectors of Nuisances. The following four candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Local Surveyors, viz., Messrs. John Daye, E. R. Ridgway, W. I. Williams, and J. A. Wilson; and twenty-one candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances.

FOREIGN AND COLONIAL.

FRANCE.—It is stated that the *Journal Officiel* will publish very shortly the decree relative to the proposed Exposition Universelle of 1900, as well as the order instituting the Commission charged with the organisation of the exhibition.——The Committee of the National Society of Fine Arts has decided, by a formal vote, that there is no reason for entering into negotiations with the Society of French Artists with a view to the fusion of the two societies.——Meissonier's house, on the Boulevard Malesherbes, has just been sold by auction. It was knocked down to his son, M. Charles Meissonier, at the sum of 800,000 fr. This sale puts an end to the project for a museum proposed by the widow of the celebrated painter.——The French painter Lafon has just been commissioned by the Municipality of Paris to execute two allegorical paintings intended to replace the portraits of Napoleon III. and of the Empress Eugénie which formerly decorated the *foyer* of the Châtelet theatre, and which were removed after the fall of the Empire.——The Ministry of War is about to construct a new wing to the Caserne Dupleix, adjoining the École Militaire. ——A Committee has just been formed, in the Seventeenth Arrondissement, for erecting a monument to the memory of Anatole de la Forge, a politician who recently committed suicide.——The municipal authorities of Paris propose to create, at Belle-Isle-on-Sea, a maritime reformatory school for refractory and undisciplined children.——There has just been inaugurated a very important new group of school buildings in the Rue Vicq-d'Azir.——The Minister of Public Instruction and Fine Arts has just commissioned of the sculptor Henri Bouillon a marble bust of the celebrated Dr. Guillotin, who gave his name to the instrument used for the execution of those condemned to death. The bust is to be placed in the Tennis-Court at Versailles. ——The Palace of Biarritz, formerly a villa residence of the Empress Eugénie, is to be put up to auction, with a reserve price of 400,000 fr., by the Chamber of Notaries of Paris.——The Municipal Council of Rouen has just voted a sum of 20,000 fr. by way of opening a subscription for the erection of a national monument to Joan of Arc on the Place Verdrel, in front of the Palace of Justice of that town.——The Ministry of War, in view of the possibility of the bombardment of the port of Havre by a hostile fleet, has decided that a new fort shall be constructed not far from that town, on the coast between St. Adresse and Octeville.——The monument erected at Anzin to the memory of the miner Fontaine, and which was inaugurated on Sunday last, is the work of a young sculptor born at Anzin, M. Theunnissen, who obtained the second Prix de Rome.——The Municipal Council of Mezières (Ardennes) has decided to postpone until next spring the inauguration of the statue of the Chevalier Bayard, which was fixed to take place at the end of September. On the other hand, the beginning of October has been decided upon for the inauguration at Givet (in the same Département) of the statue of the celebrated composer, Méhul.——A committee has just been formed at Montfort l'Amaury with the view of erecting, in that town, a statue of François Guesnay, surgeon-in-ordinary and physician to Louis XV., who died in 1774.——The death is announced of the talented landscape painter M. Brissot de Warville, born at Sens (Yonne) in 1818. He had been awarded many medals at different exhibitions.——The Prefect of the Seine has just appointed a Commission charged with making arrangements for the participation of the City of Paris and of the Département of the Seine in the International Exhibition at Chicago.——The Museum of the City of Paris has just been enriched by a fine composition by the Roman painter Cazes, given by his widow. It was exhibited in the *Salon* of 1840, and represents the "Massacre of the Innocents."——It is in contemplation to organise, for 1893, at the Champ de Mars, a great international and retrospective Theatre Exhibition, including the Greek theatre, the Roman theatre, the Mystery-Plays of the Middle Ages, the theatre under the Renaissance, the theatre of the seventeenth and eighteenth centuries, and the theatre of the nineteenth century, down to our own days. This important exhibition, due to the initiative of M. Gaillard, formerly director of the Opera, will involve the transformation of the various buildings on the Champ de Mars into *salles de spectacles*. Several theatres will be built in the garden, and in the great Machinery Gallery will be reproduced a portion of the Grand Canal at Venice, ploughed by gondolas, bordered by palaces, and crossed by bridges. The outlay is estimated at 20,000,000 fr.

STUTTGART.—The great competition for the fresco and sculptural decoration of the new National Museum at Stuttgart has been decided. Some forty designs were sent in, and nine prizes, varying in value from 150*l.* to 25*l.* were awarded. Professor Keller (Carlsruhe) obtained the first prize for his design of the fresco work, whilst two Berlin sculptors, Eberlein and Hundrieser, won the first two prizes for the sculpture. It may be noted that no Berlin painter was amongst the premiated competitors for the fresco work, they were all South Germans.

BERLIN.—The proposed International Exhibition is the general topic of conversation in all technical circles. Although there is much feeling in favour of such an exhibition in the capital, it is doubtful if the country as a whole will be so very pleased to have one. As yet it is very doubtful if the show can be arranged; if it can, 1898 will probably be the year decided upon.——Of the many competitions opened for the purpose of obtaining suggestions for the selection and laying out of a suitable site, one promoted by inhabitants of the northern district will deserve attention; the prizes offered are 150*l.* in amount.——The municipality have opened a competition for a philanthropic purpose. They have offered prizes of 50*l.*, 30*l.*, and 15*l.* to carpenters who will turn out the best suites of furniture (1) for a tenement consisting of two sitting-rooms, a bedroom, and a kitchen; and (2) for a similar tenement with only one sitting-room, the price of the sets not to exceed 45*l.* and 30*l.* respectively. In awarding the prizes, the assessing jury of eleven is to specially consider the practicability, durabilty, and design of the furniture. There will an exhibition of the work sent in.—— The question of extending the city boundaries has again come to the front. The proposed lines will cause Berlin to have a population of about three millions.——The sum paid by the municipality for damage done to private property during the spring riots amounts to 830*l.*——Quite an extraordinary number of first class and minor architectural competitions have been lately opened, and hence much activity prevails in the *ateliers*. We would specially notice one for a large synagogue in Koenigsberg, and one for a public library in the old Hanse city Bremen. Competitors for the great Dresden terminus station competition have had an extra month added to the time they had at their disposal, and, hence, there will be no decision until October.

BAVARIA.—The proposed new home for Bavarian National Arts and Crafts Collections, which is to be erected at Nuremberg, will have its foundation-stone laid this month. There will be some 50,000*l.* at the disposal of the architect, Herr von Kramer, of which sum 40,000*l.* have been voted by the Bavarian Government.——The architectural room at this year's so-called "International" Art Exhibition at Munich is a very poor one, in spite of the efforts of the managing committee and of the fair promises they had received. There are only fifty-three numbers in the catalogue; nineteen of these are attached to works of Polish architects, the only section of the profession that can boast of a decent representation. The miserable state of the architectural rooms in Berlin and Munich is solely due to the apathy of our German colleagues.

MISCELLANEOUS.

TERRIBLE FIRE AT ST. JOHN'S, NEWFOUNDLAND.—Telegraphic despatches to the *Times* state that on the 10th inst. two-thirds of the City of St. John's were devastated by a terrible fire, commencing, it seems, in a stable, in the vicinity of which there were a great many wooden houses. The Anglican Cathedral, built a few years ago, from the designs of Sir Gilbert Scott, has, in common with many other public buildings, been entirely destroyed. We gave a view and plan of the Cathedral in the *Builder* for January 22, 1881.

DISSOLUTION OF PARTNERSHIP.—The partnership between Professor Roger Smith and his son and Mr. Arthur J. Gale has been by mutual consent dissolved, and in future Mr. Gale will practise at No. 4, Serjeant's Inn, Fleet-street, while Professor Roger Smith and Mr. R. Elsey Smith will continue their practice at their present address as Messrs. Roger Smith & Son.

THE WORLD'S RAILWAYS.—Mr. Ernst Rohl, in his investigation of the railway statistics of the world, finds that in Europe there are 2·3 kilomètres of railway to every 100 square kilomètres of area, and 6·2 kilomètres for every 10,000 inhabitants. In the United States the corresponding figures are 3·3 and 39·8 kilomètres. In Great Britain there are 10·2 kilomètres, and in Belgium 17·5 kilomètres, for every 100 square kilomètre area. The total length of railways in the world is estimated at 600,000 kilomètres, or 375,000 miles; that is, about fifteen times the equatorial circumference of the earth. The average cost of European railways is estimated at 56,000*l.* per mile, and the cost of all the railways in the world at 6,423,000,000*l.* sterling.

DEMOLITION OF A HISTORIC BUILDING AT LINLITHGOW. — Workmen are at present engaged pulling down in Linlithgow an old structure, around which cling some interesting historical associations. The building, which was one of the most prominent in the town, was known as "Drummond's Lodging," so named, it is believed, by the property having at one time belonged to the Drummonds of Hawthornden. It is also supposed to have been used as a school after the Burgh School had been destroyed by Cromwell's soldiers. It is intended to construct a new block of buildings on the same site.—*Glasgow Herald.*

PROPOSED STREET IMPROVEMENTS, EDINBURGH. —At the meeting of the Edinburgh Town Council on the 12th inst., the Lord Provost's Committee submitted a report by the Burgh Engineer (Mr. Cooper) as to the probable cost of the proposed widening and improvements at Bristo-street. According to the report, the proposed improvement, which is expected to cost 23,000*l.*, consists in the acquisition and removal of a group of nine tenements, containing seventy-seven houses and ten shops, situated on the west side of Bristo-street and Charles-street, and extending from Teviot-place to the lane in rear of the north side of George-square, and occupying an area of 2,536 superficial yards. The removal of these buildings would open up the thoroughfare of Bristo-street, where at present it is, at its narrowest, only 29 ft. 11 in. in width, including footpaths, with a very considerable and somewhat congested traffic, and at the same time expose to view the M'Ewan Academic Hall, the University Union, the School of Music, and the back part of the Medical Schools, and afford suitable approaches to these buildings. The buildings situated between the Students' Union and the School of Music,—viz., the Park-place Lecture-rooms and the Jewish Synagogue,—would also require to be taken. The Lord Provost said if this scheme, after discussion, were adopted by the Council, they would require to promote a Bill, for there were too many interests involved to deal with them privately. Mr. Sloan thought, in consideration of the great improvement that would be made to the adjacent property, some contribution might be got from these proprietors. After some further conversation, the subject was allowed to lie over.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*New Market	Pontypool Loc. Bd.	60*l.*	Aug. 1
School Buildings, Skewen, Neath	Coedfranc Sch. Bd.	10*l.* 10*s.*	Aug. 5
*Municipal Technical and Art School	Accrington T. C.	50*l.* 25*l.* and 10*l.*	Aug. 15

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered
Electric Lighting, Newcastle-on-Tyne	Co-op. Wholesale Soc.	J. Thompson	July 19
Colliery Sidings and Connecting Railway, near Bell's Hill, N.B.	Wilsons & Clyde Coal Co. Lim.	Strain, Robertson, & Thomson	do.
Sewage Works, Knutsford	Altrincham R.S.A.	J. McD. McKenzie	do.
Additions to School, Buckie, N.B.	Rathven School Board	G. Sutherland	do.
*Hotel, Trebarris		T. Roderick	do.
*Making-up Road	Bromley Local Board	*Official*	do.
Water Supply, Trichinopoly	Madras Government	do.	July 20
Flagging and Paving	Benwell and Fenham Local Board	do.	do.
Nineteen Houses, Maesycwmmer, South Wales	Maesycwmmer Building Club		do.
Covered Courtings, Stable, Steading, &c. near Aberdeen			do.
Banking Premises	Wilts & Dorset Banking Co.	G. M. Silley	do.
Steel Girder Bridge, Bonar, N.B.	Ross, Cromarty, and Sutherland C. C.	Crouch & Hogg	do.
Four Houses, Carlisle	Gilbert Hill	G. Armstrong	do.
*Concrete Embankment Wall, &c.	Fulham Vestry	J. P. Norrington	do.
*Wood Paving Works	Westminster Vestry	G. B. W. Wheeler	do.
*Storm Water Outfall Culverts, &c.	Leicester Corp.	E. G. Mawbey	do.
Bell Turret and Gable to Church, Washington, Durham	Committee		July 21
*Wood Paving Works	Parish of St. James, Westminster	*Official*	do.
Library and School Buildings	Nelson Corp.	Holtom & Fox	July 22
Sewage Disposal Works	Keighley Corp.	W. H. Hopkinson	do.
Masonic Hall, &c. Saltash		J. H. Keats	July 23
School Buildings, Sharrow-lane	Sheffield School Board	C. J. Innocent	do.
Road Work	Methley Local Board	T. Thompson	do.
*Paving (Tar or Concrete) Works	Maidstone U.S.A.	W. G. Scoones	do.
Cottage and Steading, Earlsmill, Elgin N.B.	William Brown		July 25

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Electricity Works, Bradford	Yorkshire House-to-House Electricity Co.	Milnes & France	July 25
Residence and Shop, Elgin		J. Jamieson	do.
*Alterations, &c. to Workhouse	Petworth Union	H. Howard	do.
*Painting and General Repair of Buildings	Central London Sick Asylum District	W. S. Cross	do.
*Laying Watermains, &c. &c.	Norton Local Board	*Official*	do.
*Postal Sorting Office, Hammersmith	H. M. Works	do.	do.
*Guernsey Granite Cubes	St. George-the-Martyr, Southwark	do.	do.
*Supply of Materials	Rochester Corp.	do.	July 26
Cottages, Little Brington, Northampts.	Trustees of the Brington Chauntry Estate		do.
*Making New Roads, &c.	Kingswood Park Est.	E. Monson, Jr.	July 27
*Entrance Gates and Piers to Workhouse	Woolwich Union	J. D. Cook	do.
Sewage Works	Thornhill Loc. Bd.	J. C. Haller	July 28
Technical School	Bury (Lancs.) Corp.	*Official*	do.
*Broken Granite and Granite Gravel	Canterbury U.S.A.	do.	do.
*New Buildings, &c. Rochester	School Governors	Nash & Bond	do.
*Wrought-Iron Unclimbable Fencing	Heudon Loc. Bd.	S. S. Grimley	Aug. 2
*Engine House, &c. &c.	Tottenham Local Bd.	J. E. Worth	do.
*Small Public Hall, &c.	Winchester T. C.	J. B. Colson	Aug. 3
*Hospital for Infectious Diseases	Blean U.R.S.A.	H. T. Sidwell	do.
*Western Joint Asylum for Somerset	Committee	Giles, Gough, & Trollope	No date.
Additions, &c. to Schools	Tadcaster Sch. Bd.	Bromet & Thornan	do.
Five Shops, Armley, Leeds		T. Howdill	do.
Shop and Three Cottages, Caerphilly	Wm. Jones	E. D. Parry	do.
Canal Cuttins, Middlewich	Murgatroyds Ltd.		do.
Offices and House	Ammanford (S. Wales) Colliery Co.		do.
Ham Curing Establishment, Harrow	Johnstone Bros.		do.
Additions, &c. Schools, Caldewgate, Carlisle		G. D. Oliver	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Surveyor's Assistant	Wallasey Loc. Bd.	100*l.*	July 21
*Clerk of Works	Battersea Vestry	3*l.* 10*s.* weekly	July 22
*Smoke Inspector	Lambeth Vestry	120*l.*	July 25
*Surveyor	Condover High, Bd.	150*l.*	Aug. 1

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., & viii. *Public Appointments, p.* xx.

REREDOS, ST. JAMES'S CHURCH, HIGHER BROUGHTON, LANCASHIRE.—A stone reredos has just been erected in St. James's Church, Higher Broughton, in memory of the late Dr. Theodore Drayton Grimke. The side and east walls of the chancel have also been decorated, the design being the Rose of Sharon, treated conventionally by Mr. R. Bennett, of Manchester. The reredos has been executed by the firm of Messrs. Earp & Hobbs, of Manchester, the whole being carried out from the designs and under the superintendence of Mr. H. R. Price, architect, Manchester.

STATUE, DALLINGTON CHURCH, NORTHAMPTONSHIRE.—The Church of St. Mary, at Dallington, has just received an addition to its reredos in the shape of a sculptured statue of St. James-the-Great. The reredos was erected when the church was restored in 1883 from a design by Mr. E. Law, of Northampton, and the statue is from a design by the same architect. The figure in question stands upon a Caen stone corbel. The work has been carried out by Mr. Harry Hems, of Exeter.

THE ENGLISH IRON TRADE.—In but few of the English iron trade centres is any change in the depressed condition of the market apparent, and the progress of the elections throughout the country seems the prevailing topic on the various exchanges. The deplorable state of the iron and steel industries is shown in the Board of Trade returns for June. In that month a falling off of no less than 143,547 tons in the exports of iron and steel is recorded, and over the half-year the decline amounts to 384,406 tons. Prices generally are maintained, but Scotch pig-iron quotations are lower. As mentioned above, the various branches of the iron and allied trades remain unchanged. The coal market is quieter.—*Iron.*

IMPROVEMENTS AT BILSTON. — Major-General Carey, of the Local Government Board, held an inquiry at the Town-hall, Bilston, on Tuesday last, the Commissioners having applied for permission to borrow 4,000*l.* for new roads, and 3,000*l.* for new stalls in the Market Hall, and for the electric lighting of the same. Plans and a description of the works were given by Mr. C. L. N. Wilson, C.E., Town Surveyor, and the inquiry was conducted by Mr. J. D. Wassell, Town Clerk. The Inspector afterwards visited the site of the proposed new roads and the Market Hall.

OPENING OF ROSEBERY-AVENUE.—This new street was formally opened on Saturday afternoon. The avenue, named in compliment to the first chairman of the London County Council, is 1,173 yards in length, by 60 ft. wide, and will eventually be flanked by shops. The project was initiated by the Metropolitan Board of Works, was planned by Sir Joseph Bazalgette, partially executed by his son, and has been completed by Mr. Binnie, Engineer of the Council. The total cost is 353,526*l.*, including 300*l.* per yard purchase-money, but exclusive of returns to be derived from unused land. It was stated at the opening ceremony by Mr. Henry Clarke, ex-chairman of the Improvements Committee of the Council, that one section is borne on fourteen arches, and that a spacious subway runs under all, to carry underground pipes. Dwellings for people removed from partially dilapidated property had been provided in the neighbourhood. Mr. Hutton, Deputy Chairman of the Council, also addressed the assembly present, and formally handed over the street to the local authority, the Vestry of Clerkenwell.

CAPITAL AND LABOUR.

BRICKMAKERS' STRIKE IN THE WEST LONDON DISTRICT.—We regret to learn that this strike still continues, and that there now appears to be no likelihood of its being brought to a termination before the end of the present brickmaking season. The masters have held three conferences with the men,—two at the London Chamber of Commerce, and one at the offices of Mr. W. Willett, Sloane-square; the latter at the instance of the Rev. G. H. Manbey, Vicar of St. Albans, Acton-green, in whose district a great many of the men reside, and who is naturally anxious to bring about a termination of the strike, recognising as he does the great loss which will fall upon the men during the winter months owing to the fact that no fresh clay will require to be prepared for next year's working. After having had two abortive meetings, the masters thought that some basis for discussion should first be settled; and as Mr. Manbey urged the adoption of a sliding-scale, he was requested to write a letter defining such a basis for it as the masters might reasonably be disposed to consider. This he did, and the meeting took place, but the men then shifted their ground, and declined to consider a sliding scale for the present season. The masters, therefore, were unable to proceed further, and the strike goes on. Following on the strike of Cowley last year, it is evident that the action of the men will cause a short supply of bricks to the London market, and, as a consequence, it is feared that it will be a very long time before bricks are cheap again.

STRIKE IN THE BUILDING TRADE, SHEFFIELD.—According to the *Sheffield Daily Telegraph*, another strike has occurred in the local building trade. It again affects the masons. All the stone-workers in the employment of Messrs. Graham & Sons, at present engaged on the extensions to the Central Schools, have ceased work, and have consequently thrown the bricklayers out of employment as well as themselves. The stone required for the alterations and additions is brought from Messrs. Graham's quarries in the neighbourhood of Huddersfield, where it is dressed and trimmed. The masons urge that this is against the understanding they have with their employers, and have come out on strike until the matter is settled. Altogether about fifty persons are affected.

LOCK-OUT IN THE BOLTON BUILDING TRADE.—The failure to effect a settlement on the 8th inst. of the Bolton plumbers' dispute, which has now existed for ten weeks, resulted on the 9th inst., says the *Leeds Mercury*, in all the federated building trades in the town being locked out, and accordingly about 1,000 men, including joiners, bricklayers, masons, painters, plasterers, and excavators, left work at noon. This was in accordance with the resolution of the Master Builders' Federation, who gave the operative plumbers up to the 9th inst. in which to come to terms, and failing this, a lock-out. The two points in dispute are as to the time of starting work in winter, and the allowance for "country" money. During the progress of the strike numerous attempts have been made to arrive at a settlement, and the masters, it is said, have made concessions which have not been accepted. Latterly the Operatives' Federation have been called in, and have supported the men in their claims.

THE CARDIFF BUILDING TRADES' DISPUTE.—The Master Builders' Association, having written to the Operative Masons' Society offering conciliation, the latter have replied, stating that they are unable to move from the position that they took up at first, viz., that until the 6th clause is removed they cannot negotiate. This was considered at a masters' meeting, held on the 12th inst. at the Angel Hotel, Cardiff. Alderman David Jones presided, and there were forty-eight members present. The letter of the strike secretary of the Operative Masons having been read, it was agreed to adhere also to the original demands.

THE CARPENTERS' STRIKE AT MERTHYR.—After a duration of six weeks, the strike of operative carpenters and joiners at Merthyr has been settled, those masters who had stood out having consented to grant the 7½d. an hour which the men demanded.

MEETINGS.

SATURDAY, JULY 16.

Liverpool Engineering Society.—Visit to the Liverpool Corporation Refuse Destructor and the Liverpool Cold Storage Company's Works.

Edinburgh Architectural Association.—The Sketching Class to meet at Royston House, Carolina Park, Granton, to make measured drawings and sketches of the south front of the mansion. 3 p.m.

WEDNESDAY, JULY 20.

Builders' Foremen and Clerks of Works' Institution.—Half-yearly meeting. 8.30 p.m.

THURSDAY, JULY 21.

Incorporated Association of Municipal and County Engineers.—Annual Meeting, to be held in Bury, Lancashire. Presidential address by Mr. J. Cartwright.

FRIDAY, JULY 22.

Architectural Association.—Special General Meeting to consider the validity of the late election. 7 30 p.m.

Incorporated Association of Municipal and County Engineers.—Annual Meeting, Bury, Lancashire (continued).

SATURDAY, JULY 23.

Architectural Association.—Visit to the new Lunatic Asylum erected by the London County Council at Claybury, Essex, by permission of the architect, Mr. G. T. Hine. Meet at Woodford Station, G.E.R., 3.7 p.m.

Incorporated Association of Municipal and County Engineers.—Annual Meeting, Bury, Lancashire (continued).

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

9,526.—WHITE LEAD: *L. Labois.*—This refers to an improved process for rapidly manufacturing white lead which coats well, consisting in the treatment in a closed vessel of a tribasic solution of super-saturated lead by a current of compressed carbolic acid and, if necessary, of steam (the carbonation being discontinued before the precipitate, becoming crystalline, shall have lost the qualities of a good white lead) in combination with an immediate separation of the mixture, so as to separate the solution at the proper moment. In the manufacture of the white lead a special turbine, as described in the specification, is employed with the object of saving labour and cost, and hastening the manufacture.

13,196.—WINDOWS: *H. Gardner.*—This invention relates to appliances for preventing the rattling of sliding window-sashes, panels, shutters, and the like, and for preventing the entry of dust and passage of rain, wind, or draught. Angle-plates are fitted in the grooves in which the sashes slide, the angle-plates being pressed upon by long plate or strip springs of undulating form, so that in the case of two sliding sashes being in the same frame, as in houses, they can both be kept from rattling by the same spring, whether open or closed, one spring being on each side. The angle plates are carried by bearers on which they have a transverse sliding action, to compensate for shrinkage or other climatic changes. This invention is specially applicable to the sliding sashes of railway and other carriage windows.

1,963.—WINDOWS: *H. S. Moore.*—This invention has almost the same object as the preceding one, but by different means, and may be applied to shutters and doors. To prevent rattling, the window is in an automatic manner jammed against the frame in which it slides, by means of an eccentric device able to turn on a suitable pivot or pin. This device has formed in it a recess of a suitable shape into which, when the window is being closed, there enters a curved finger or projection that is attached to the window, and which during the completion of the closing movement causes the eccentric device to make a partial rotation, and to press the window against its frame. A stop arrests the device when the window is opened, and retains it in a position such that the projection before mentioned will again engage with it when the window is being closed.

5435.—SASHES: *T. S. Jerome.*—This specification relates to an improvement in the manufacture of cased frames for single or double hung-sashes, having for its object the construction of the pulley-styles of cased frames in such a manner as to facilitate removal of the sashes, thus gaining access to the weights, and for preventing loose and draught-admitting beads. The invention can only be thoroughly understood in conjunction with the detailed drawings.

6,358.—WINDOW-SASHES: *H. J. Ford.*—This relates to window-sashes which are usually intended to slide in their containing frames, and consists in a method by which such sashes may be so mounted as to be capable not only of sliding, but also of folding inwards when desired. Each sash is provided on one side with two or more hinges, one leaf of each lock being fixed to the sash, the other forming a runner engaging in a groove in the window frame, this groove being preferably formed of one or two bars of steel or iron fixed to the frame, so that the leaf of the hinge runs in the slot between these bars, and is prevented from drawing out by lugs or cross-pins on it engaging behind the bars. The other side of each sash is provided with one or more sliding bolts, which take into a groove in the corresponding face of the window-frames. The sash-cord on the side of the sash where the hinges are, remains fixed to the sash, but the opposite sash-cord which carries the weights balancing the sash on the other side, and carrying the sliding bolts, is made detachable from the sash for opening the latter, or folding it inwards when desired.

NEW APPLICATIONS FOR LETTERS PATENT.

June 27.—11,937, R. Michell, Anti-fouling and Non-corrosive Composition Paint.

June 28.—11,970, J. Enwer, Door and Window-fastener.—12,008, R. Evered, Metallic Sash-lifts, &c.—12,012, S. Sprat and F. Bailey, Pipe Subway.—12,014, J. Wedderburn, Locks and Bolts for Fastening Doors, Gates, &c.—12,045, M. Goodwin, Chimney or Ventilating-shaft Top for the Prevention of Down-draught to Chimney, Soil, or other Ventilating Pipes, &c.—12,058, J. Wild, Gulleys.

June 29.—12,071, W. Pick, Water Mains and Water Service-pipes.—12 083, J. and J. Jackson, Flushing Cisterns.—12,016, E. Reiss, Means for Connecting or Fastening together Building Stones or Slabs for the Formation of Walls or Ceilings.—12,124, P. Bramwell, Fastener for Window-sashes, &c.

June 30.—12,143, W. Maxfield, Wall-hooks, and Sockets for fastening same.—12,174, O. Terp, Artificial Stone and Hard Compositions Applicable to Building and Paving Purposes, to Moulds for Cement-castings, to Safes, &c.—12,193, J. Adams, Warming and Ventilation.

July 1.—12,215, O. Stifft, Brick Kilns.—12,217, I. Collins, Wedge Sash-fastener.—12,221, J. Hartell, the Telescoped Circumferential Atmospherical Deflecting Chimney-pot.

July 2.—12,269, G. Thomas, Improved (cramped) Wood-pavement.—12,288, D. Doyle, Coating Walls or other Surfaces with Lime-wash, Cement-wash, Liquid Putty, Paints, Tar, &c.—12,298, S. & S. Bissell, Operating and Fastening Fanlights.—12,314, J. Reed, Window-fasteners.—12,331, H. Lake, Artificial Stone or Cement.—12,332, H. Lake, Artificial Stone or Cement.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,157, M. McNamara, Flushing Cisterns.—10,224, G. Tweedy, Chimney-pots and Cowls.—10,964, W. Smyrk, Sash Fastenings.—10 974, A. Walker, Buttons for Doors, &c.—11,190, B & R. Wild, Vertical Band Saw-Machine.—11,207, W. Turner, Frames for Ships' Doors.—11,215, F. Shuffrey, Window Sash Fastener.—11,373, J. Thompson and others, Bakers' Ovens.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

13,059, W. Hughes & C. Young, Fastening and Unfastening Fanlights, &c.—19,374, T. Utley, Ships' Ventilators.—8,811, A. Petersen, Stays for Hinged Windows.—10,309, W. Naylor, Cords for Hanging Window-sashes.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JULY 2.—By *Messrs. Spelman*: F. farm, 115a. 3r. 1p., West Beckham, Norfolk, 2,300*l.*

JULY 4.—By *Elliott, Son, & Boyton*: 48, Rochester-row, and 49, Coburg-row, Westminster, u.t. 41 yrs., g.r. 20*l.*, 880*l.*; "Warwick Cottage," Warwick-rd., Stoke Newington, u.t. 67 yrs., g.r. 10*l*, r. 31*l.*, 370*l.*; 64, Bryantwood-rd., Holloway, u.t. 71 yrs, g.r. 6*l.* 10s, r. 40*l.*. 355*l.*; 1, 2, and 3, Lincoln-ter., Finchley, u.t. 94 yrs., g.r. 10*l.* 10s., 325*l.*—By *Humbert, Son, & Flint*: "Grove House," Hunton, Kent, and 103a. 1r. 1p., f., 6,900*l.*—By *Ball, Norris & Hadley*: 1 and 1A, Camberwell-green, u.t. 69 yrs., g.r. 140*l.*, r. 315*l.*, 1,120*l.*; 12, Rylett-rd., Shepherd's-bush, u.t. 83 yrs., g.r. 10*l.*, r. 50*l.*, 500*l.*; 39 and 41, Rotherfield-st., Islington, u.t. 48 yrs., g.r. 8*l* 4s., r.76*l.*,775*l.*—By *F. West*: 22, Macfarlane-rd., Uxbridge-rd., u.t. 82 yrs., g.r. 5*l*, r. 26*l.*, 250*l.*—By *Prickett & Ellis*: 24 to 27, High-st., Hampstead, f., r. 260*l*, 4,870*l.*; Southwood-lane, Highgate, f.g.r. of 58*l.* 10s., reversion in 78 yrs., 1,560*l.*; f.g.r. of 15*l*, South-grove, ditto in 69 yrs., 420*l*; f.g.r. of 30*l.*, ditto in 69 yrs., 810*l.*; 78, Wood-street, Cheapside, f., r. 250*l.*, 5,000*l.*—By *Fuller, Moon, & Fuller*: The lease of "Sparrow Farm," Cheam, 103 acres, u.t. 16 yrs., r. 90*l.*, 420*l.*—By *Blake, Haddock, & Carpenter*: Freehold land, 22 acres, West Wickham, 4,500*l.*; Freehold cottage and two enclosures of land, Knockholt, 1,000*l.*; "Benson's Farm," near Horsham, 27a 3r. 35p., f., 1,000*l.*—By *Randall, Beard, & Baker*: Nos. 213 to 221, odd, City-rd., u.t. 30 yrs., g.r. 55*l.*, r. 410*l.*, 3,045*l.*; 103, Arlington-st., Islington, u.t. 44 yrs., g.r. 5*l.*, r 34*l*, 315*l.*; f.g.r. of 22*l.*, Adelaide-rd., Hampstead, u.t. 53 yrs, g.r. 8*l.*, 420*l.*

JULY 5.—By *T. A. Turner*: 159, Belsize-rd., Hampstead, u.t. 62 yrs., g.r. 8*l.* 8s., 450*l.*—By *G. E. Clarke*: 1 and 2, Rose-bank, Walthamstow, f., r. 62*l.*, 1,040*l.*—By *J. W. Kemsley*: "Padnall Hall," near Chadwell Heath, and 20a. 1r. 4p., f., 1,425*l.*; an enclosure of freehold land, 4a. 1r. 18p., 320*l.*—By *A. Richards*: The residence, "Stonleigh," The Green, Tottenham, f., 1,500*l.*; "Elmfield," Little-pk.-gardens, Enfield, f., r. 47*l.* 10s., 700*l.*; three plots of freehold land, 670*l.*; "The Laurels," f., r. 65*l.*, 1,000*l.*; a plot of freehold land, Gentlemen's-row, 15*l.*; "High View," The Ridgway, u.t. 78 yrs, g.r. 15*l.* 15s., r. 75*l.*, 900*l.*—By *Debenham, Tewson, & Co.*: "The Priory," Totteridge, Herts, and 5a. 1r. 9p., f., 3,000*l.*; "Cotlands," Horley, and 120a. 1r. 11p., f., 4,000*l*; an enclosure of freehold land, 0a. 0r. 35p., 50*l.*; copyhold cottage and blacksmith's shop, 0a. 3r. 3p., 500*l.*—By *E. E Croucher & Co*: 9, and 10, Chandos-pl., Broadstairs, Kent, f., r. 145*l.*, 2,060*l.*; 9, Chandos-sq., f., r. 50*l.*, 570*l.*; 5, and 6, Chandos-rd., f., r. 43*l.*, 495*l.*—By *C. & F. Rutley*: "Alma House," Caterham, and 1a. 1r. 27p., f., 500*l.*; freehold cottage and forge, r. 20*l.*, 275*l.*; three freehold cottages, r. 32*l.* 10s., 300*l.*; two cottages, Horne Court Hill, Bletchingly, r. 12*l.* 10s., 215*l.*—By *R. W. Scobell*: "The Cedars," Byfleet, Surrey, and 6a. 3r. 1p., f., r. 180*l.*, 3,600*l.*

JULY 6.—By *Waters & Waters*: "Danehurst," Murray-rd., Northwood, f., r. 73*l*, 975*l.*—By *A. Savill & Son*: "The Tingrith Estate" of 1,112 acres, Bedfordshire, f., 27,000*l.*; "Parsonage Farm," Shalford, Essex, 67a. 2r. 9p., f., 1,100*l.*—By *J. Tydeman*: 1 to 4, Dunning-ter., Ponder's-end, u.t. 79 yrs., g.r. 17*l.*, r. 88*l.*, 650*l.*; the residence called "The Elms," f., 1,200*l.*—By *Slee, Son, & Carden*: 1 to 7, Queen's-ct., Hackney, c., 320*l.*; 93, Well-st., c., r. 50*l.*, 440*l.*—By *Hards & Bradly*: the lease of 22, Warwick-st., Regent's-st., u.t. 4 yrs., 100*l.*—By *Walton & Lee*: "Nether Walstead Farm," Hayward's Heath, 93a. 3r. 20p, f., 3,700*l.*

JULY 7.—By *Cockett & Henderson*: "The Manor House," Wanstead, and 1a. 1r. 38p., f., 1,050*l.*—By *Debenham, Tewson & Co.*: "Marrowells," Walton-on-Thames, and 12½ acres, f., 6,000*l.*; 16 and 17, Wormwood-st., City of London, f., r. 180*l.*, 5,150*l.*; f.g.r. of 45*l.*, Upper Thames-st., Peter's-hill, reversion in 60 yrs., 1,220*l.*; 18, Goodman's-yd., Minories, f, 1,000*l.*; two plots of f. woodland, Brasted, Kent, 1a 3r. 31p., 250*l.*; 13 and 15, Munster-rd., Fulham, u.t. 89 yrs., g.r. 17*l.*, r. 66*l.*, 480*l.*—By *Newbon & Co.*: 12 to 18 (even), King Henry-st., Ball's Pond, f., 860*l.*; 1, Christchurch-rd., Crouch End., u.t. 70 yrs., g.r. 12*l*, r. 90*l.*, 1,000*l.*; 48, Elwood-st., Highbury, f., r. 26*l*, 280*l.*; 29, Myrtle-st., f., 200*l.*; 45, Durham-rd., Holloway, f., r. 20*l*, 315*l.*; f.g.r. of 4*l.*, Durham-rd., reversion in 61 yrs., 100*l.*; 53 and 55, Alsen-rd., u.t. 69 yrs, g.r. 7*l.* 10s., 250*l*; 1, Middlesex-st., u.t. 69 yrs., g.r. 2*l.* 10s., 100*l.*; 85 and 87, Duncombe-rd., Hornsey, f., 575*l.*; 63, Scholefield-rd., f., 275*l.*; 163, Ramsden-rd., Balham, f., r. 63*l.*, 900*l.*; 1, Elmsworth-villas, Kew-gardens, u.t. 86 yrs., g.r. 6*l* 5s., 335*l.*—By *D. Watney & Sons*: "The British and Foreign Wharf," East Smithfield, f., area 7,750 ft., and jetty, r. 2,612*l.* 2s., 32,000*l.*; 11, Burr-st., f., r. 35*l.*, 550*l*; f.g.r. of 46*l.* 4s., Victoria Dock, West Ham, reversion in 80 yrs., 910*l.*; f.g.r. of 49*l.* 16s., Cundy-rd., ditto 80 yrs., 975*l.*—By *Briant & Son*: No. 44, Clapham-rd., and stabling, f., r. 71*l.*, 955*l.*; 1, St. Agnes'-villas, Kennington, u.t. 70 yrs., g.r. 10*l*, r. 55*l.*, 600*l.*—By *Stimson & Sons*: 30 to 44 (even), Rosendale-rd., Dulwich, f., 2 150*l.*; 73 and 75, Rosendale-rd., f., 575*l.*; f.g.r. of 19*l.* 10s., Park-rd., reversion in 41 yrs., 505*l.*; 9 and 10, Uxbridge-villas, f., r. 60*l.*, 550*l.*; "Northview," Paget-rd., f., r. 38*l.*, 370*l.*; "Ellevue," f., r. 36*l.*, 375*l.*

JULY 8.—By *Harman Bros.*: 29, Norfolk-rd., Dalston, u.t. 69 yrs., g.r. 5*l.* 10s., r. 34*l.*, 280*l.*—By *Walker & Runtz*: No. 1, Finsbury-pk.-rd., u.t. 74 yrs, g.r. 6*l.* 6s., 390*l.*—By *Norton, Trist, & Gilbert*: 64, Lewisham-rd., Catford, f., 300*l.*; "The Plough and Harrow" beer house, f., r. 50*l.*, 1,020*l*; 70 and 72, Lewisham-rd., f., r. 72*l.*, 1,250*l.*; a plot of freehold land, 500*l.*; 76 and 78, Lewisham-rd.; and four cottages u.t. 66 yrs., g.r. 47*l.* 10s., 510*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g r. for ground-rent; r. for rent; f. for freehold; c. for copyhold: l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a for per annum; yrs. for years; st. for street; rd, for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	9/0/0	0/0 0
Teak, H.I... load	9/10/0	15/0/0
Sequoia, U.S.ft.cu.	2/3	3/0
Ash, Canada load	2/10/0	4/0/0
Birch, do.	3/5/0	4/10/0
Elm, do.	3/10/0	4/15/0
Fir, Dantzic, &c.	1/10/0	2/10/0
Oak, do.	3/0/0	5/5/0
Canada.....	5/10/0	7/0/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/10/0	5/0/0
Lath, D'ntzic, fath	5/0/0	6/0/0
St. Petersburg	5/0/0	7/0/0
Deals, Finland		
2nd & 1st std 100	7,10/0	9,10 0
Do, 4th & 3rd..	7/0/0	8/0/0
Do. Riga	6/10/0	8/0/0
St. Petersburg,		
1st yellow ..	10/10/0	14/10/0
Do. 2nd yellow	8/0/0	9/10/0
Do. white	7/10/0	10/0/0
Swedish	7/0/0	15/10/0
White Sea	8/0/0	17/0/0
Canada, Pine 1st	20/0/0	26/0/0
Do. do. 2nd....	14/10/0	16/0/0
Do. do. 3rd, &c.	8/0/0	10/0/0
Do. Spruce. 1st	8/10/0	11/0/0
Do. do. 3rd & 2nd.....	6/15/0	8/0/0
New Brunswick	7/0/0	7/10/0
Battens, all kinds	3/10/0	16/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/8/0	0/13 6
Do. 2nd.....	0/7/0	0/10/6
Other qualities	0/3 6	0 8'0
Cedar, Cuba ..ft.	/3½	/4½
Honduras, &c.	/3½	/4
Mahogany, Cuba,	/4½	/6½
St. Domingo, cargo av	/4½	2/0
Mexican do. do	/4	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	13/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0/0	18/0/0
Satin, St. Domingo ....ft.	0/0 8	0/1/3

TIMBER (*continued*).		
Satin, Porto Rico	0/0/8	0/1/6
Walnut, Italian..	0/0/3½	0/0/7
METALS.		
IRON—Pig, in Scotland .....ton	2/1/4½	'2 1'4½
Bar, Welsh, in London.....	5/17/6	6/0/0
Do. do. at works in Wales	5/7/6	5/10/0
Do. Staffordshire, in London	6/5/0	6/15/0
COPPER—British, cake and ingot	47/0/0	48/0/0
Best selected ..	49/0/0	49/10/0
Sheets, strong..	56/0/0	57/0/0
Chili, bars	44/10 0	44/17/6
YELLOW METAL lb.	0/0/5½	0/0/5½
LEAD—Pig, Spanish ....ton	10/10/0	10/12'6
English, com. brands	10/12'6	10/17,6
Sheet, English, 3 lbs. per sq. ft. and upwards ..	12/0/0	0/0/0
Pipe	12/10/0	0/0/0
ZINC—English sheet .....ton	25/15/0	26'0/0
Vieille Montagne.....	26/5/0	0/0/0
TIN—Straits	98/0/0	98 5'0
Australian	98'0/0	98 5 0
English Ingots.	101/0/0	101/10/0
OILS.		
Linseed .....ton	18/10/0	18/15/0
Cocoanut, Cochin	24/15/0	25/0/0
Do. Ceylon	22/0/0	0 0 0
Palm, Lagos	22/5/0	22/10/0
Rapeseed, English pale	24/15/0	2?'0/0
Do. brown	23/0/0	0/0/0
Cottonseed ref...	19/7/6	0/0/0
Oleine	21/10/0	22/10/0
Lubricating, U.S.	4/0/0	5/0/0
Do. refined	5'10/0	12'0/0
TAR—Stockholm barrel	0/19/0	0/0/0
Archangel	0/12/6	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 12 *noon on Thursdays.*]

BARNET.—For alterations and additions to Barnet Town Hall. Mr. J. White, architect, Barnet:—

Marriott	£350	Houghton & Son	£293
Austew	326	Allen & Son	218
Hughes	297		

BARRY (near [Cardiff).—Accepted for the erection of five villa residences, and two cottages, Porthkerry-road, Barry. Mr. W. H. Watling, architect, Council-chambers, Newport:—

Jenkins & Arnold, Barry £2,865 0 0

BARRY (near Cardiff).—Accepted for the erection of three shops, Barry Dock-road, Barry. Mr. W. H. Watling, architect, Council-chambers, Newport:—

Jenkins & Arnold, Barry £2,908 0 0

BRIGHTON.—For the erection of public elementary schools, Stanford-road, Brighton, for the Brighton and Preston School Board. Mr. Thomas Simpson, 16, Ship-street, Brighton, and Mr. John W. Simpson, 10, New-inn, Strand, W.C., joint architects:—

Mid Kent Building Co. ..	£14,300	Stimpson & Co.	£13,376
V. P. Freeman	13,990	Chappell	13,132
Holloway Bros	13,814	Taylor	13,023
Killby & Gayford	13,784	Longley & Co.	12,541
King	13 695	Taylor Bros, Hastings*	12 207
Peters	13,605	* Accepted.	
Johnson & Co.	13,532		

BROMLEY (Kent).—For the erection of a house in Orchard-road, for Mr. Thos. Bennett. Messrs. Gibson & Russell, architects, 11, Little Queen-street, Westminster:—

F. & H. F. Higgs	£1,783	Murridge	£1,595
Holloway Bros.	1.727	T. Crossley & Sons.	1,577
Carmichael	1,674	F. P. Duthoit	1,557
T. D. Gaty	1,600	Robertson	1,555

CARDIFF.—For converting three houses, Nos. 210, 212, and 214, Cowbridge-road, Cardiff, into shops and dwelling-houses, for the Newport Property Investment Co. Mr. W. H. Watling, architect, Council-chambers, Newport:—

J. Hopkins	£280	W. Price	£165
C. Lock	189	E. W. Ashley, Cowbridge-road, Cardiff (accepted) ..	159
E. Richards	179		

CHISLEHURST.—For the erection of a police station at Chislehurst, for the Receiver for the Metropolitan Police District. Mr. John Butler, Architect, New Scotland Yard. Quantities by Mr. W. H. Thurgood:—

Graham & Co.	£3,980	Gardener	£3,650
Naylor & Son.	3,887	Hart Bros.	3,645
Calland	3,848	Knight	3,629*
Wallis	3,740	Lathey Bros.	3,540
Higgs & Hill	3,684	Avald	3,500
Chappell	3,670	Wiltshire, junr.	3,494
Groves	3,657		

CROSSNESS (Kent).—For the erection of a school building at the Crossness Sewage Pumping Station, for the London County Council:—

W. Webster	£2,748	The Co-operative Builders	£2,300
Kirk & Randall	2,807		

DARTFORD.—For new chapel at the Catholic school for boys, Dartford, Kent. Mr. Fredk. A. Walters, F.S.A., architect, 4, Great Queen-street, Westminster. Quantities by Mr. John B. Lofting, 4, Great Queen-street, S.W.:—

Lewis & Sons	£1,400	Longley & Co.	£1,240
Peter Cook	1,370	Gregory & Co.	1,157
Denne & Sons	1,329	Jas. Buckle	1,030

EPSOM.—For the erection of two blocks of four cottages each, at Burgh Heath, near Epsom, Surrey, for Mr. Chas. Beall. Mr. F. J. Dibble, architect, Dorking:—

W. J. Wells	£1,692 0	Robt. Peters, Banstead*	£1,317 10
J. B. Potter	1,400 0	* Accepted.	

HOLNE (Devon).—Accepted for erecting farm buildings at Yonder Stoke Farm, in the parish of Holne, Devon. Mr. W. M. Tollit, architect, Totnes, Devon:—

J. H. Foaden, Ashburton £257 16 0

LISS (Hants).—Accepted for warming the new church at Liss, Hants. Sir Arthur Blomfield & Sons, architects:—

John Grundy £120 0 0

LONDON.—Accepted for decorations to drawing-room at 134, Westbourne-terrace for Mr. J. Zossenheim:—

Greatorex & Co., Limited £156

LONDON.—Accepted for sundry improvements, new stable fittings, &c., for Mr. S. J. Parker, at his stables, Sussex-mews, West:—

Greatorex & Co., Limited £110

LONDON.—For erecting new lecture-hall and alterations to Park Chapel, Crouch End, N. Mr. Alfred Conder, architect, Palace-chambers, 9, Bridge-street, Westminster. Quantities by Mr. E. J. Paine, F.S.I., of 11, Great James-street, Bedford-row :—

	New Hall.	Alterations to Chapel.	Total.
J. Grover & Son	£4,590	£1,042	£5,632
Dove Bros.	4,610	1,005	5,615
Wagstaff & Son	4,583	983	5,566
G. S. S. Williams & Son.	4,416	994	5,410
J. Chapman	4,393	973	5,366
E. Lawrance & Sons	4,267	994	5,261
J. Greenwood	4,257	945	5,202
Stimpson & Co.	4,193	885	5,078
E. Toms	4,121	857	4,978
Mattock Bros.	4,090	884	4,974

LONDON.—Accepted for sanitary work, ventilation and improvements to Hospital Premises, "Sunnyside," Upper Avenue-road, N.W., for Miss Davidson :—
Greatorex & Co., Limited £1,142

LONDON.—Accepted for decorative work at Chislett-road, West Hampstead, for Mr. S. Flatau :—
Greatorex & Co., Limited £288

LONDON.—For the erection of a Dispensary in Abbey-street, Bermondsey, for the Guardians of the Poor of the St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge. Quantities by Mr. W. T. Farthing :—

J. Bentley	£2,837 0	H. Faulkner	£2,498 0
M. Coxhead	2,677 0	J. O. Richardson	2,460 0
W. & H. Castle	2,639 0	T. Hull	2,358 13
A. Kellett	2,606 0	Coulsell Bros.	2,342 0
J. Bullers	2,585 0	Balaam Bros.*	2,279 0
W. Wells	2,582 0	* Accepted.	

LONDON.—Accepted for repairs, &c., at the United St. Saviour's Almshouses, Hamilton-road, Norwood. Mr. H. Hardwicke Langston, architect, 9, Great James-street, Bedford-row, London :—
Chas. Down, Croydon £494 0 0

Sanitary Improvements.
B. Finch & Co., London £384 0 0

Ventilation to Chapel and Vestry.
The Climax Ventilating Company £65 0 0

Wrought-iron Entrance-gates.
Jones & Willis £65 0 0

LONDON.—Accepted for new workrooms, &c., at 51, Maddox-street, W., for Mlle. Maria. Mr. Thomas J. B. Holland, architect, Boscombe, Hants :—
David Prosser, Charlotte-street, W. £363

LONDON.—For rebuilding shops, Nos. 51 to 61, High-street, Stoke Newington, N., for the Vernon Investment Association, Ltd. Messrs. Saville & Martin, architects, Dacre House, Arundel-street, Strand W.C. Quantities by Mr. E. J. Sadgrove, 22, Surrey-street, Strand, W.C. :—
S. Goodall (accepted) £4,528
[Full list given last week.]

LONDON.—For the re-erection of the "Flying Horse" public-house, No. 6, Oxford-street, and the property adjoining, comprising No. 4, Oxford-street, and Nos. 10, 11, 12, and 13, Hozier's-court, Tottenham-court-road, W., for Messrs. H. & R. Baker. Messrs. Saville & Martin, architects, Dacre-house, Arundel-street, Strand, W.C. Quantities by Mr. E. J. Sadgrove, 22, Surrey-street, Strand, W.C. :—
Kirk & Randall (accepted) £12,120
[Full list given last week.]

LONDON.—For a new warehouse, Clapham-road, for Messrs. Alford & Alder. Mr. M. Bruton, architect. Quantities supplied :—

Rowe	£1,800	Burmah & Sons	£1,688
W. Smith	1,751	J. Hooper	1,611
F. & H. Higgs	1,720	Holliday & Greenwood	1,449
Bryant	1,711	Archer	1,375

NEW SWINDON.—For the erection of new Sunday-schools in connexion with St. Mark's Church. Mr. Walter Whincop, architect, 44, Norcott-road, Stoke Newington, N. Quantities by Mr. W. Courtney Fagg, 20, Eastbank, Stamford-hill, N. :—

Hall	£4,379 8	Reeks	£4,000 0
Williams	4,135 14	Martin & Co.	3,937 0
Wiltshire	4,050 0		

NEWPORT (Mon.).—For the erection of a block of offices, Marshes-road, Newport, Mon., for Mr. H. J. Parnall, J P. Mr. W. H. Watling, architect, Council-chambers, Newport, Mon. Quantities by Mr. J. D. Whitaker, Newport, Mon. :—

J. Wilkins	£860 0	J. Francis & Son	£797 0
J. Linton	850 0	Charles Lock, Caerleon-road, Newport*	735 10
E. Richards	850 0	* Accepted.	
W. Blackburn	824 0		

NEWPORT (Mon.)—For the erection of metal stamping works, Marshes-road, Newport, Mon., for Messrs. A. Davies & Co. Mr. W. H. Watling, architect, Council-chambers, Newport. Quantities by Mr. J. D. Whitaker, surveyor, Newport :—

Johnson Bros.	£1,029	Wm. Price	£875
J. Linton	990	J. Sharem	857
J. Wilkins	974	Charles Lock, Caerleon-road, Newport*	850
E. Richards	940	* Accepted.	
J. Francis & Son	920		

REDDITCH (Worcester).—For house and stabling, for the Rev. Canon Newton, of Redditch Mr. Temple L. Moore, architect. Quantities by Mr. John B. Lofting, 4, Great Queen-street, Westminster, S.W. :—

E. Giles	£10,249	Hulns & Sons	£8,700
R. Thompson	9,997	Barnsley & Sons	8,580
John Bowen	9,716	Smallwood & Co.	8,500
James Smith & Sons	9,357	Parnell & Sons	8,451
Henry Lovatt	9,261	Jas. Longley & Co.	8,395
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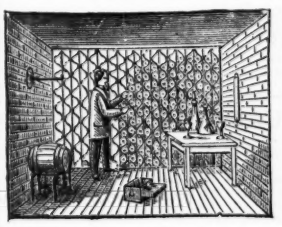

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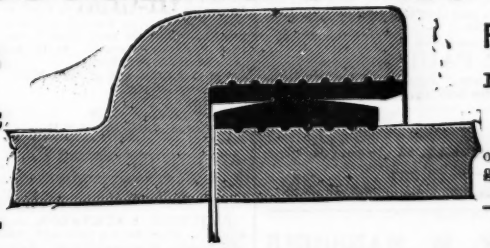

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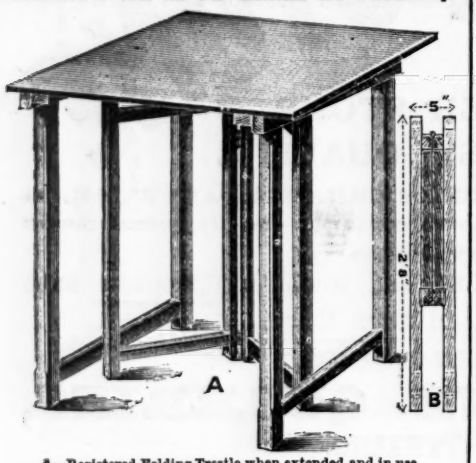

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for a Sanitary Pipe and Brick Works in North Wales.—Address, stating age, experience, where last employed, and salary expected, to H. W. care of Brown's, 4, Little George-st. Westminster.

WANTED, for Provinces, First-class

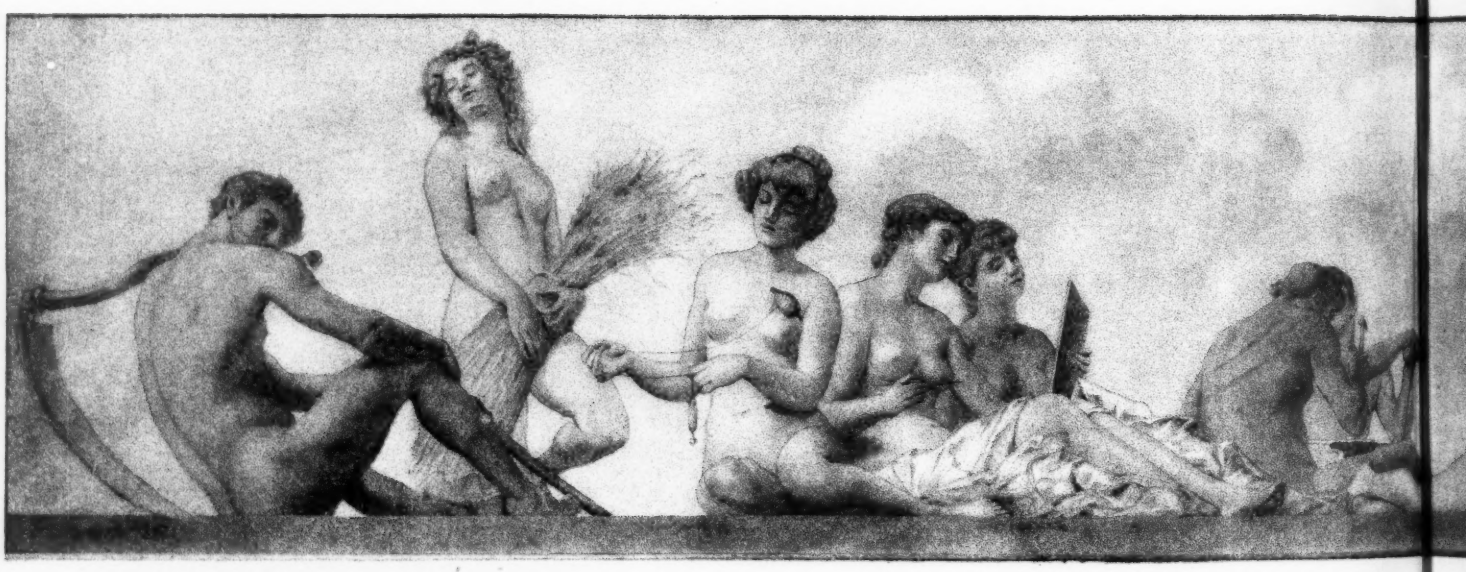
GLASS PAINTER (Figure). One that is used to designing 1 in. scale and drawing full-size cartoons, and painting same. Say if can show specimens of work.—State age, wages, &c. to Box 292, Office of "The Builder."

ENGINE DRIVER.—WANTED, a

thoroughly practical man to drive a portable engine in a mason's yard, and willing to assist generally on saw frames, rubbing bed, &c.—State age, and full particulars, Box 295, Office of "The Builder."

GOOD MACHINIST WANTED, for

Elephant Machine.—Apply to FOREMAN, Allen & Sons, Palmerston Works, Kilburn.

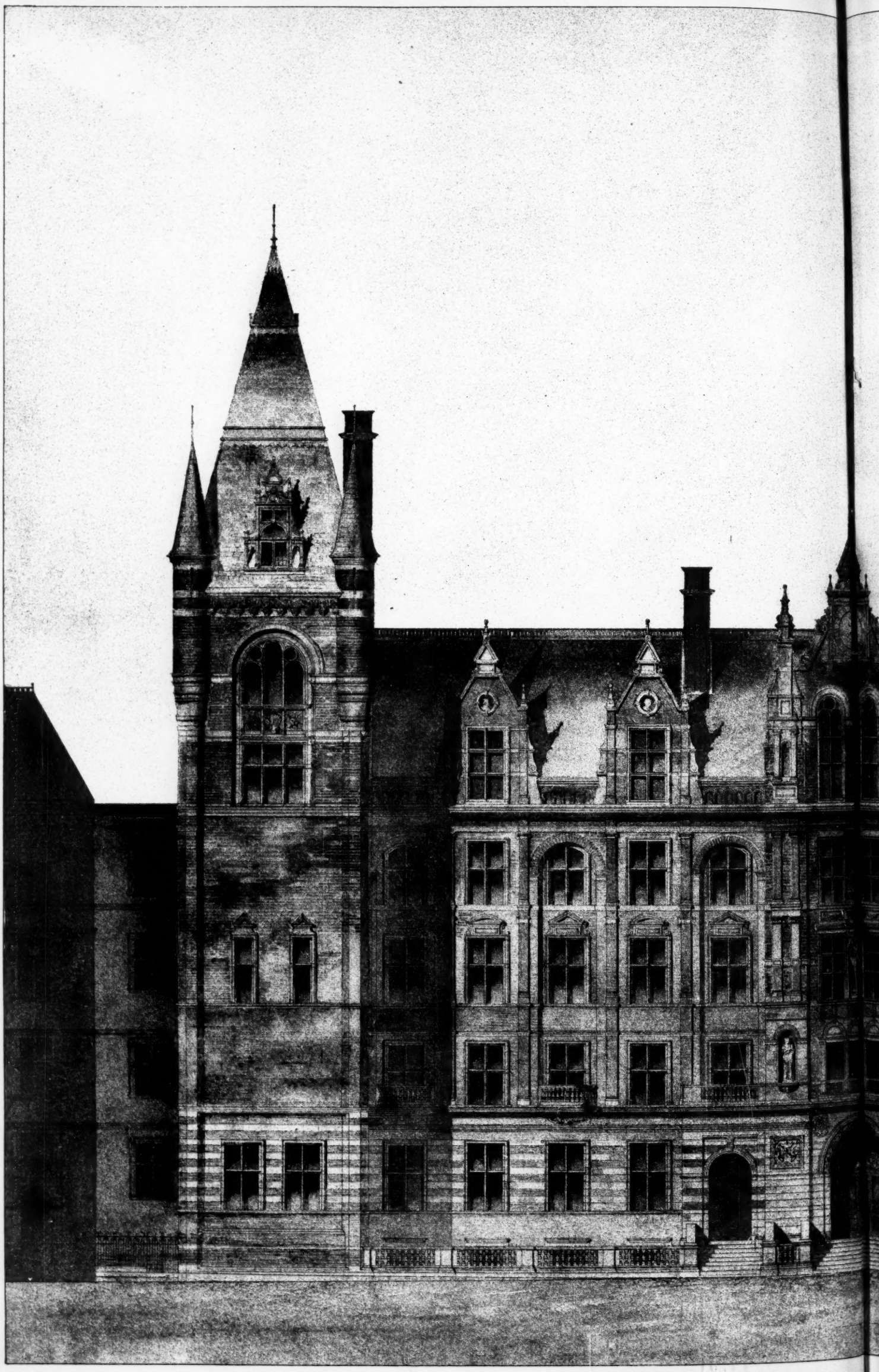


DECORATIVE PANEL: "YOUTH: THE TOWERS

Royal Academy Exhibition, 1892.

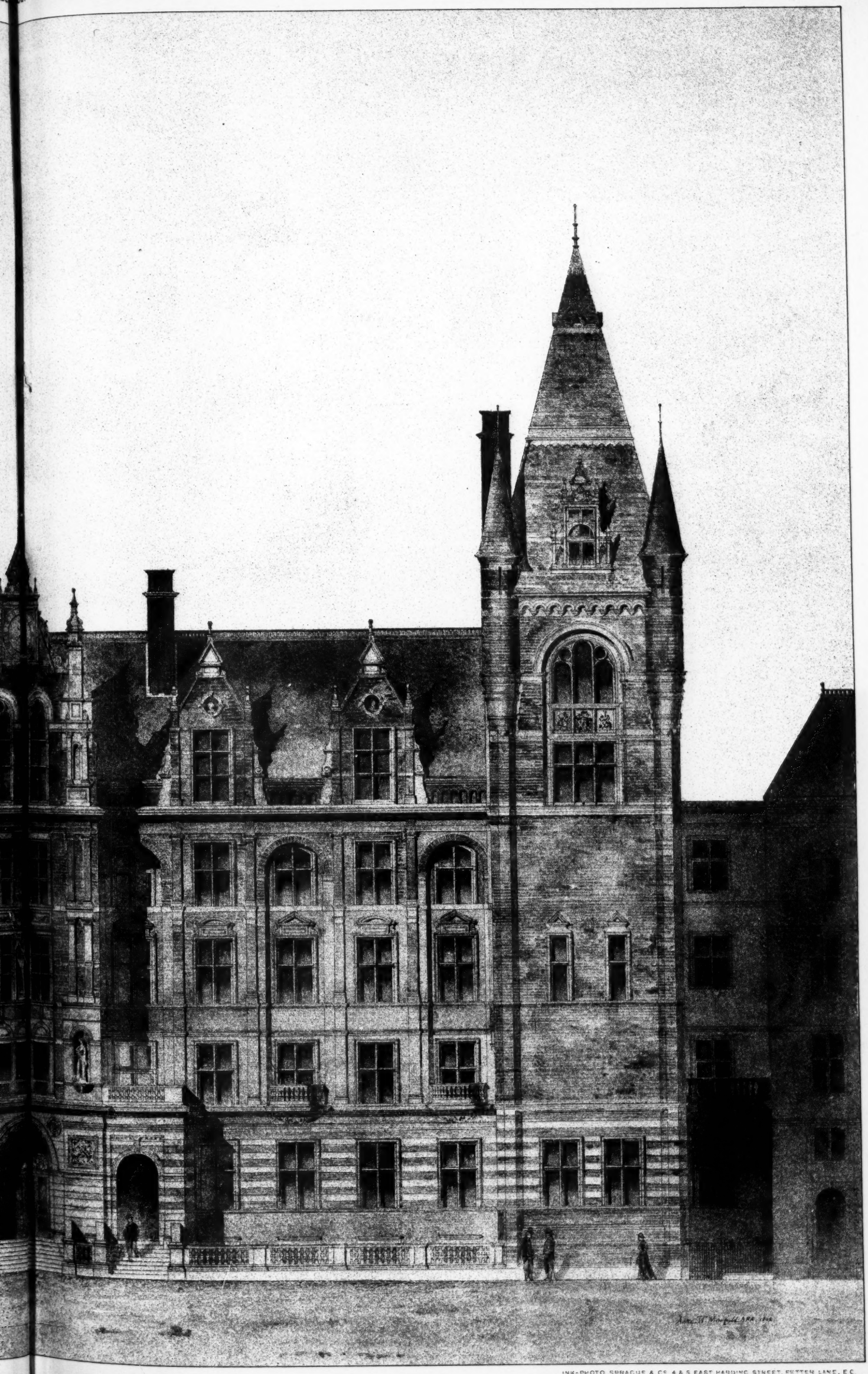
INK. PHOTO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E.C.

E TOILERS AND THE IDLERS."—By Mr. G. Natorp



Royal Academy Exhibition, 1892.

ROYAL COLLEGE OF MUSIC, SOUTH KENS[I]GT[ON]



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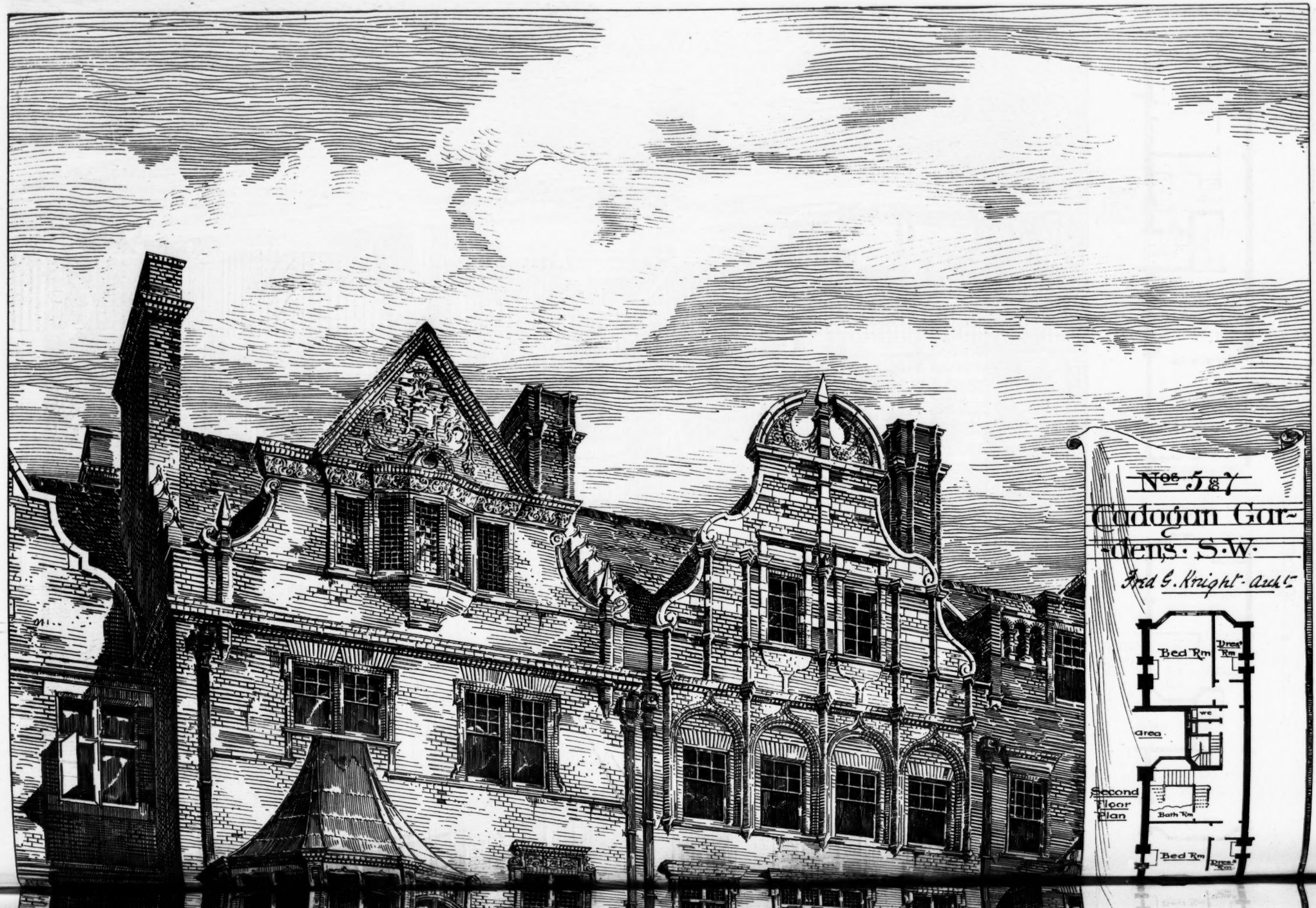
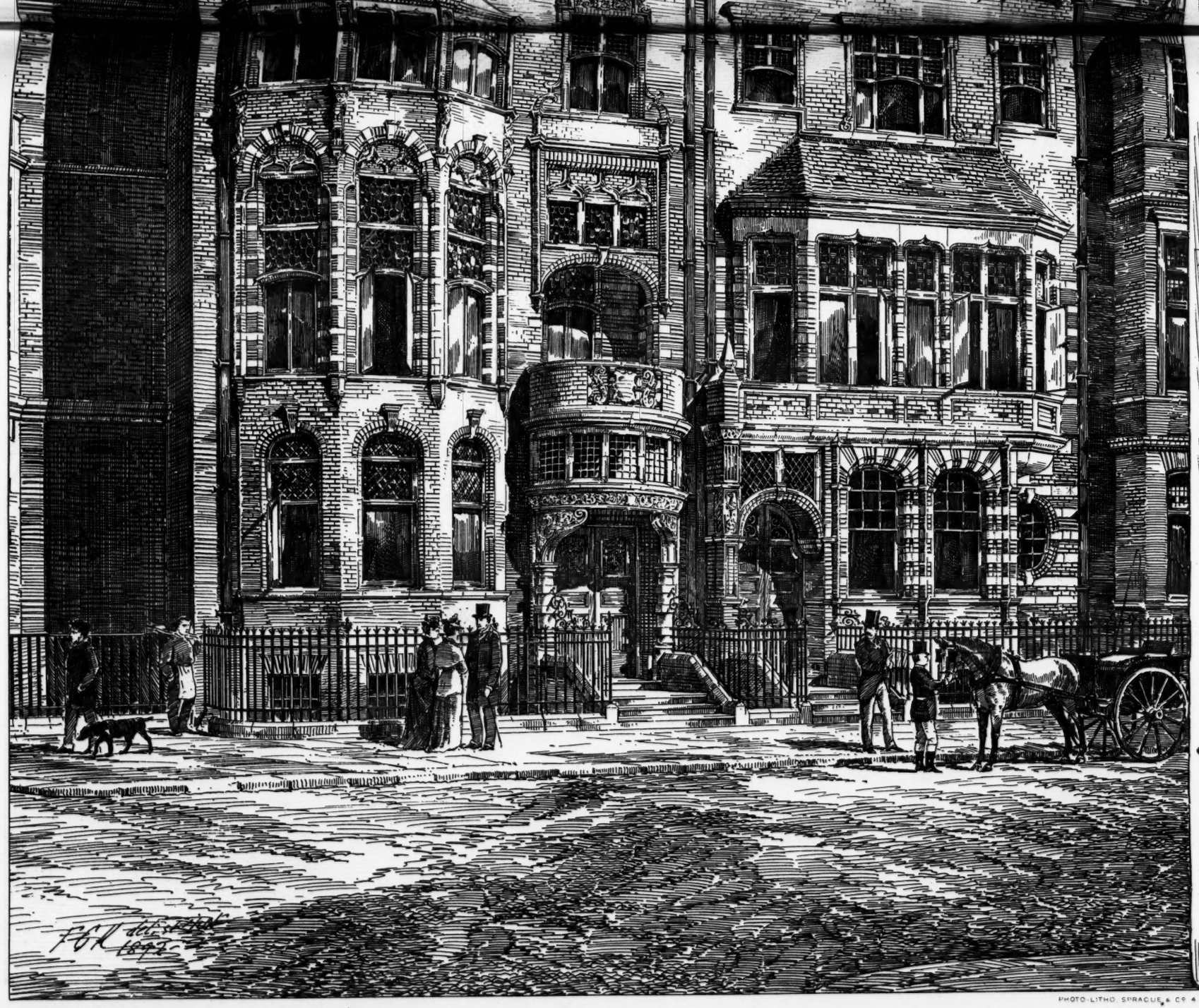
KENSINGTON.—Sir A. W. Blomfield, A.R.A., Architect.



Nos 5 & 7
Cadogan Gardens. S.W.
Fred G. Knight. Archt.



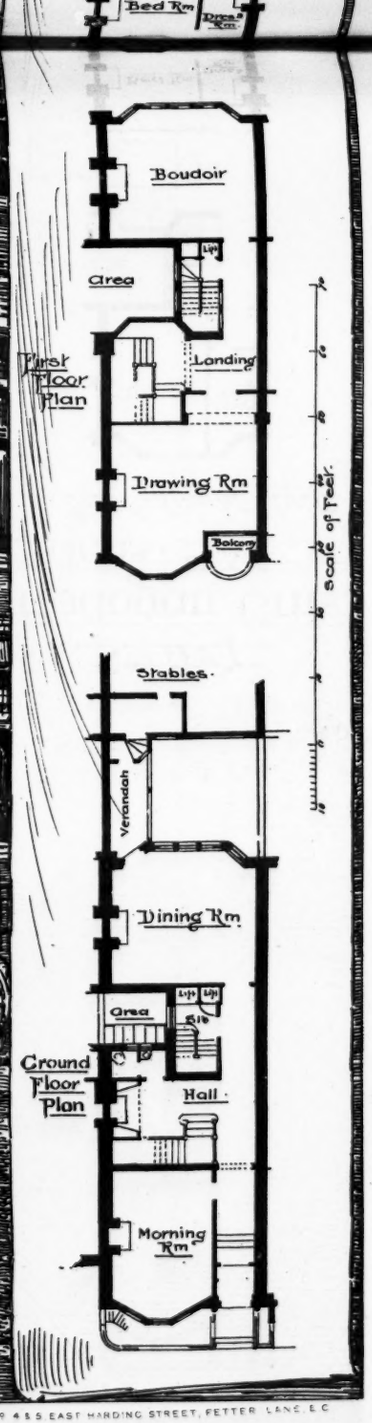
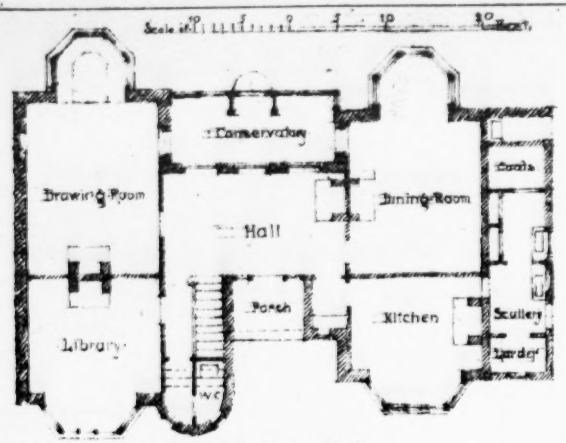


PHOTO-LITHO. SPRAGUE & Co 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

House at Northwood

Mr R.A.Briggs. A.R.I.B.A., Architect.

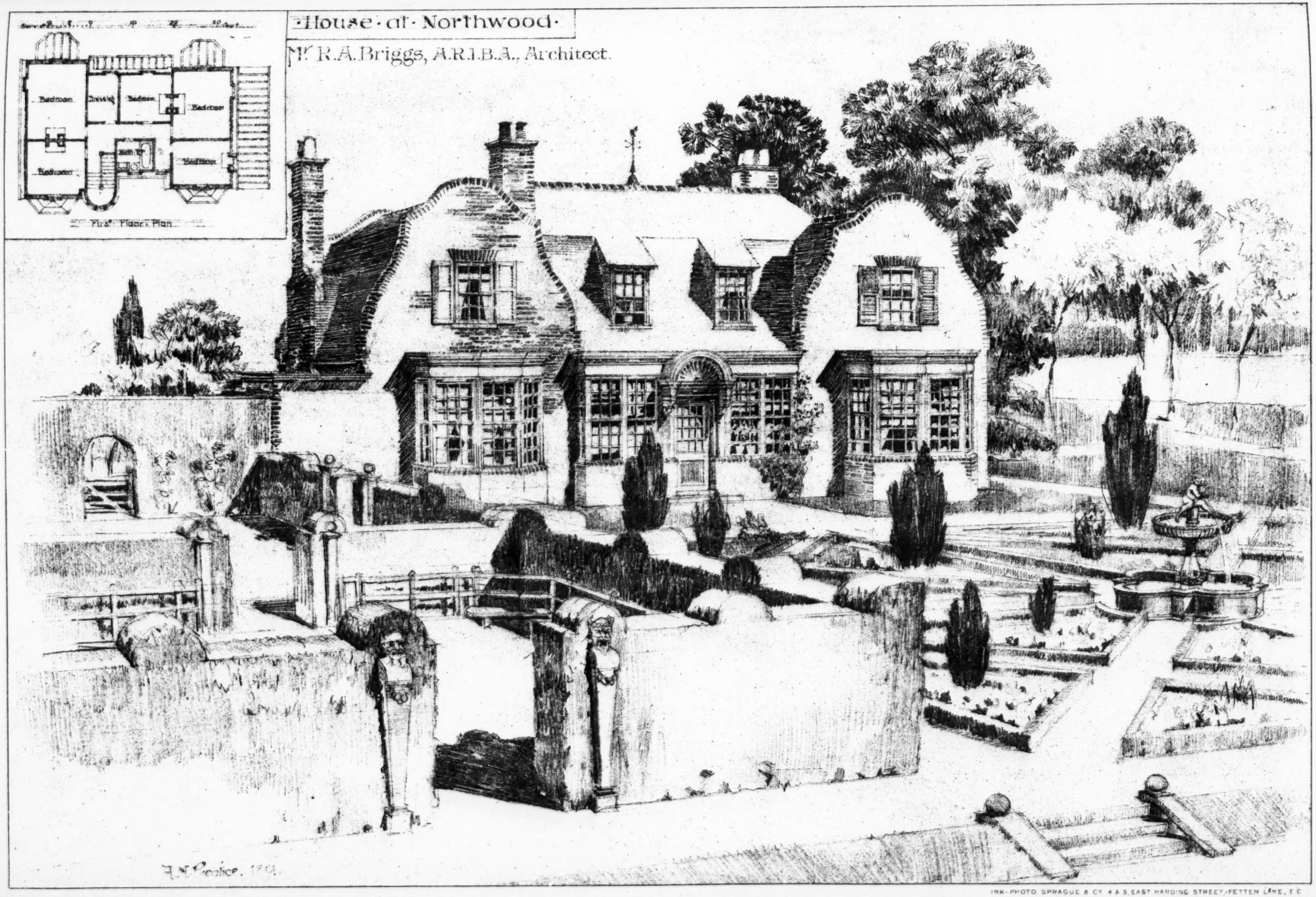


Ground Floor Plan

INK-PHOTO SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

House at Northwood.

Mr R.A.Briggs, A.R.I.B.A., Architect.



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Royal Academy Exhibition, 1892.